UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY AND POLLUTION PREVENTION

MEMORANDUM

Date: 31 January 2013

Subject: Cyantraniliprole. Application (Syngenta) for Section 3 Registration for Use of WG Formulation on *Brassica* (Cole) Leafy Vegetables (Group 5), Cucurbit Vegetables (Group 9), Fruiting Vegetables (Group 8-10), Leafy Vegetables (non-Brassica) (Group 4), and for Use of FS Formulation on Sunflower and Tuberous and Corm Vegetables (Subgroup 1C). Summary of Analytical Chemistry and Residue Data.

PC Code: 090098
MRID No.: See Below
Petition No.: 1F7894 (DuPont)
Assessment Type: Single Chemical
TXR No.: None
Decision No.: 451670

DP Barcode: D407962
Registration Nos.: 100-RUER, 100-RUEE, 100-RUEN, 100-RURI
Regulatory Action: Section 3 Registration
Registration Case No.: NA
CAS No.: 736994-63-1
40 CFR 180.TBD

From: Stephen Funk, Senior Scientist
Risk Assessment Branch III
Health Effects Division (7509P)

Through: Jeff Dawson, Acting Branch Chief
Risk Assessment Branch III
Health Effects Division (7509P)

To: Thomas Harris/John Hebert, RM07
Insecticide Branch
Registration Division (7505P)

Summary of Submitted Residue Chemistry Studies			
OPPTS 860 Series Guideline	MRID Number	Monograph Volume3/ Annex B	Title
860.1500	48432514	7.6.1.6	Magnitude of the Residues in or on Apple from Side-by-Side Bridging Trials to Compare – Cyantraniliprole 100 OD and Cyantraniliprole 40 WG Formulations: Final Report
860.1500	48432515	7.6.1.7	Magnitude of the Residues in or on Leaf Lettuce from Side-by-Side Bridging Trials to Compare – Cyantraniliprole 100 OD and Cyantraniliprole 40 WG Formulations: Final Report
860.1500	48432516	7.6.1.8	Magnitude of the Residues in or on Cantaloupe from Side-by-Side Bridging Trials to Compare – Cyantraniliprole 100 OD and Cyantraniliprole 40 WG Formulations: Final Report

860.1500	48432517	7.6.1.9	Magnitude of the Residues in or on Cabbage and Mustard Greens from Side-by-Side Bridging Trials to Compare – Cyantraniliprole 100 OD and Cyantraniliprole 40 WG Formulations: Final Report
860.1500	48432518	7.6.1.12	Cyantraniliprole (A16971B) Magnitude of the Residue in or on Hot Peppers from Side-by-Side Bridging Trials Comparing Soil and Foliar Applications: Final Report
860.1500	48432519	7.6.1.11	Cyantraniliprole (A16971B) Magnitude of the Residue in or on Spinach from Side-by-Side Bridging Trials Comparing Soil and Foliar Applications: Final Report
860.1500	48432520	7.6.1.10	Cyantraniliprole (A16971B) Magnitude of the Residue in or on Cucumber from Side-by-Side Bridging Trials Comparing Soil and Foliar Applications: Final Report
860.1500	48758902	7.6.1.1	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Head Lettuce from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations
860.1500	48758906	7.6.1.2	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Bell Pepper from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations – USA 2011
860.1500	48758904	7.6.1.3	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Summer Squash from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations – USA 2011
860.1500	48758903	7.6.1.4	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Cucumber from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations – USA 2011
860.1500	488758905	7.6.1.5	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Tomato from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations – USA 2011

Table of Contents

Background 4
Executive Summary 4
Regulatory Recommendations 4
Pre-Registration Data Needs 4
Condition-of-Registration Data Needs 5
Tolerance Considerations 5
Analytical Method 5
International Harmonization 5
Revisions to Petitioned-For Tolerances 5
Residue Profile 5
Residue Chemistry Guidelines 7
Directions for Use (860.1200) 7
Nature of the Residue (860.1300/1850) 10
Residue Analytical Methods (860.1340) 10
Multiresidue Methods (860.1360) 10
Storage Stability (860.1380) 10
Water, Fish, and Irrigated Crops (860.1400) 12
Food Handling (860.1460) 12
Meat, Milk, Poultry, and Eggs (860.1480) 12
Crop Field Trials (860.1500) 12
Processed Food and Feed (860.1520) 30
Rotational Crops (Field; 860.1900) 31
Tolerance Derivation 31

Background

The petition for tolerances and registrations for the first food and feed uses of cyantraniliprole are being made by DuPont (D407961, S. Funk, 01/28/2013). The residue chemistry metabolism, analytical methods, storage stability, livestock feeding, processing, and rotational crops studies are reviewed as part of the DuPont petition and are incorporated by reference for the present considerations. Syngenta has requested the use of its WDG (water- dispersible granule) formulation for application to *Brassica* (Cole) Leafy Vegetables (Group 5), Cucurbit Vegetables (Group 9), Fruiting Vegetables (Group 8-10), Leafy Vegetables (non-Brassica) (Group 4). To support that request, field trials studies have been submitted to bridge the WDG use to the existing DuPont OD (oil dispersion) and SE (suspensoemulsion) uses. Syngenta has also requested use of an FS (flowable suspension) formulation for treatment of sunflower seeds and tuberous and corm vegetable (group 1C) seeds. These uses exist for the DuPont FS or SC (suspension concentrate)formulation.

Executive Summary

Syngenta has provided bridging trials to compare its WG formulation to the DuPont OD formulation. When used per label directions for foliar applications, the WG and OD formulations result in very similar residue concentrations for cyantraniliprole on the raw agricultural commodities.

Syngenta has provided bridging trials to compare residues from soil application of the WG formulation with foliar application of the WG formulation. When applied according to the proposed label use patterns, the foliar applications result in significantly higher cyantraniliprole residue concentrations on the raw agricultural commodities than the soil applications.

Note: Some formulations are a mixture of cyantraniliprole and thiamethoxam. This review addresses only cyantraniliprole.

Regulatory Recommendations

HED has examined the residue chemistry database for cyantraniliprole. Pending submission of a revised Section B (see requirements under Directions for Use) there are no residue chemistry issues that would preclude granting Section 3 registration for the requested crop commodity uses of the WG and FS formulations of cyantraniliprole. The establishment of cyantraniliprole tolerances has been addressed in D407961 (S. Funk,01/28/2013).

A human health risk assessment is forthcoming (N. Tsauer, D404762).

Pre-Registration Data Needs

<u>860.1200 Directions for Use</u>

- The rotational crop restrictions must be amended, as follows:

(1) Root and tuber vegetables (crop group 1) must be listed as a 30-day plant back interval (not immediate plantback).
(2) The following commodities may be added to the 30-day plantback interval: foliage of legume vegetables (crop group 7), legume vegetables (crop group 6), forage, fodder and straw of cereal grains (crop group 16), nongrass animal feeds (crop group 18).
(3) The plantback interval for all crops not otherwise specified must be changed from 120 days to 1 year This is consistent with the DuPont labels.

Condition-of-Registration Data Needs

There are no condition-of-registration data needs.

Tolerance Considerations

The proposed uses of the WG and FS formulations will lead to residues no greater than those from the DuPont recommended tolerances under consideration. Therefore, no new tolerances have been proposed, and none are needed.

Analytical Method

Adequate methods exist for data collection and for enforcement of the tolerances in plant and livestock commodities.

International Harmonization

Harmonization of tolerances is addressed in D407961.

Revisions to Petitioned-For Tolerances

No tolerances were petitioned. All proposed uses will be covered by the DuPont petition (D407961).

Residue Profile

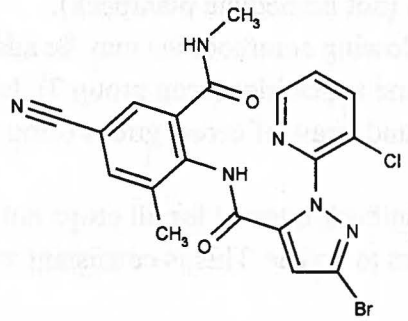
Table 1. Chemical Nomenclature.	
Chemical structure	
Common name	Cyantraniliprole
Company experimental name	DPX-HGW86; SYN545377
IUPAC name	3-bromo-1-(3-chloro-2-pyridyl)-4'-cyano-2'-methyl-6'-(methylcarbamoyl)-pyrazole-5-carboxanilide
CAS name	3-bromo-1-(3-chloro-2-pyridinyl)-*N*-[4-cyano-2-methyl-6-[(methylamino)carbonyl]phenyl]-1*H*-pyrazole-5-carboxamide
CAS registry number	736994-63-1
Formula	$C_{19}H_{14}BrClN_6O_2$
End-use product (EP)	100-RUEE, 20% WDG; 100-RUEN, 48.8% Fs; 100-RURI, 48.8% FS; 100-RUER, 20.0% WDG

Table 2. Physicochemical Properties of the Technical Grade of Cyantraniliprole.		
Parameter	Value	Reference
Physical state	White fine powder solid	MRID 48208438
Melting point	224 °C	MRID 48208438
Density	1.4965 g/cm^3 at 20 °C	MRID 48208438
Water solubility (20 °C)	14.24 mg/L	MRID 48208438
Solvent solubility (g/L at 20 °C)	Acetone 6.54 Ethyl acetate 1.96 Dichloromethane 5.05 Toluene 0.576 n-Octanol 0.79 Methanol 4.73 o-Xylene 0.29 Acetonitrile 2.45	MRID 48208438
Vapor pressure	5.13 x 10^{-15} Pa at 20 °C	MRID 48208438
Henry's Law Constant (at 20 °C)	pH7 = 1.7 x 10^{-18} atmosphere.m^3/mole	MRID 48208438
Octanol/water partition coefficient	Log Kow = 1.94 $\pm$ 0.11 at 20 °C	MRID 48208438
Hydrolysis and photolysis	pH 4: Stable pH 7: Stable pH 9: Hydrolyzed very rapidly with a half-life of <1 day. One major metabolite was observed. Photolysis: 0.233 days at 40° latitude in the summer to 4.12 days at 60° latitude in the winter	MRID 48208438
Dissociation constant (pK$_a$)	8.80 $\pm$ 1.38 at 20 °C	MRID 48208438

Residue Chemistry Guidelines

Directions for Use (860.1200)

The petitioner has submitted draft specimen labels for the end-use products containing cyantraniliprole listed in Table 3. The products include a WG and FS formulation. A summary of the proposed use patterns on food and feed crops is detailed in Table 4.

Table 3. Summary of Proposed End-Use Products for Agricultural and Food/Feed Use (Syngenta).

Trade Name	File Symbol No.	ai (% of formulation)	Formulation Type	Target Crops	Label Date
Mainspring Insect	100-RUEE	20.0% (20.0% thiameth-oxam) 3.2 oz ai each/lb	WDG (water-dispersible granule)	Fruit and nut trees (non-bearing) Vegetable plants grown for resale: Fruiting vegetables Cucurbit vegetables Brassica vegetables	-
A17960A ST	100-RUEN	48.8% (600 g ai/L)	FS (flowable suspension)	Potato	-
A17960B ST	100-RURI	48.8% (600 g ai/L)	FS (flowable suspension)	Potato Sunflower	-
A16901B CP	100-RUER	20.0% (20.0% thiameth-oxam) 3.2 oz ai each/lb	WDG (water-dispersible granule)	Brassica vegetables Cucurbit vegetables Fruiting vegetables Leafy vegetables Tuberous and corm vegetables Citrus	-

Table 4. Summary of Proposed Directions for Use of Cyantraniliprole (Syngenta)

Applic. Timing, Type, and Equip.	Formulation	Applic. Rate (lb ai/A)	Max. No. Applic. per Season	Max. Seasonal Applic. Rate (lb ai/A)	RTI (days)	PHI (days)	Use Directions and Limitations
Brassica (Cole) leafy vegetables							
Soil (In-furrow spray at seeding or transplanting; post seeding, post transplant, hill drench; drip (trickle) chemigation; shanked into root zone)	A16901B WG 200 g/kg (0.20 lb ai/lb) cyantraniliprole + 200g/kg thiamethoxam	0.14 – 0.18	1	0.4all	N/A	30	Apply within 21 days of planting or transplanting.
Foliar (ground, aerial, chemigation)		0.05 – 0.088	N/S	0.4 all	7	1 head and stem 7 leafy greens	Minimum of 10 gal water per acre for ground application and 5 gal water per acre for aerial application. May be applied through low-pressure micro-sprinkler or drip type irrigation
Cucurbit vegetables							

Table 4. Summary of Proposed Directions for Use of Cyantraniliprole (Syngenta)

Applic. Timing, Type, and Equip.	Formulation	Applic. Rate (lb ai/A)	Max. No. Applic. per Season	Max. Seasonal Applic. Rate (lb ai/A)	RTI (days)	PHI (days)	Use Directions and Limitations
Soil (In-furrow spray at seeding or transplanting; post seeding, post transplant, hill drench; drip (trickle) chemigation; shanked into root zone)	A16901B WG 200 g/kg (0.20 lb ai/lb) cyantraniliprole + 200g/kg thiamethoxam	0.14 – 0.18	1	0.4all	N/A	30	Apply within 21 days of planting or transplanting.
Foliar (ground, aerial, chemigation)		0.05 – 0.088	N/S	0.4 all	5	1	Minimum of 10 gal water per acre for ground application and 5 gal water per acre for aerial application. May be applied through low-pressure micro-sprinkler or drip type irrigation
Fruiting vegetables							
Soil (In-furrow spray at seeding or transplanting; post seeding, post transplant, hill drench; drip (trickle) chemigation; shanked into root zone)	A16901B WG 200 g/kg (0.20 lb ai/lb) cyantraniliprole + 200g/kg thiamethoxam	0.14 – 0.18	1	0.4 all	N/A	30	Apply within 21 days of planting or transplanting.
Foliar (ground, aerial, chemigation)		0.05 – 0.088	N/S	0.4 all	5	1	Minimum of 10 gal water per acre for ground application and 5 gal water per acre for aerial application. May be applied through low-pressure micro-sprinkler or drip type irrigation
Leafy vegetables (except Brassica)							
Soil (In-furrow spray at seeding or transplanting; post seeding, post transplant, hill drench; drip (trickle) chemigation; shanked into root zone)	A16901B WG 200 g/kg (0.20 lb ai/lb) cyantraniliprole + 200g/kg thiamethoxam	0.14 – 0.18	1	0.4all	N/A	30	Apply within 21 days of planting or transplanting.
Foliar (ground, aerial, chemigation)		0.05 – 0.088	N/S	0.4 all	7	7	Minimum of 10 gal water per acre for ground application and 5 gal water per acre for aerial application. May be applied through low-pressure micro-sprinkler or drip type irrigation
Potato							
Seed treatment	600 g/L FS (5.01 lb/gal) A17960B	0.21 – 0.47 at 3500 pounds/ acre	1	0.47	N/A	N/A	Apply to potato seed with equipment designed to apply liquid slurry. Best results are obtained if potatoes are allowed to dry and

Table 4. Summary of Proposed Directions for Use of Cyantraniliprole (Syngenta)

Applic. Timing, Type, and Equip.	Formulation	Applic. Rate (lb ai/A)	Max. No. Applic. per Season	Max. Seasonal Applic. Rate (lb ai/A)	RTI (days)	PHI (days)	Use Directions and Limitations
		seeding rate. (6.0 – 13.5 g/ 100 kg tuber; 0.006 – 0.0135 lb ai/cwt)					planted the same day as treatment. Maximum storage 2 – 3 weeks.
Sunflower							
Seed treatment	600 g/L FS (5.01 lb/gal) A17960B	0.1 – 0.2 lb ai/cwt	1	0.2 lb ai/cwt	N/A	N/A	
Tuberous and corm vegetables							
Soil (in-furrow spray during planting; apply impregnated on dry granular fertilizer before or during planting; at plant emergence by direct spray to the soil near base of plant and incorporate with irrigation; at plant emergence with overhead chemigation after hilling)	A16901B WG 200 g/kg (0.20 lb ai/lb) cyantraniliprole + 200g/kg thiamethoxam	0.081 – 0.12	1	0.4 all	N/A	N/S	May be applied by chemigation, including sprinkler irrigation equipment.

The Syngenta labels contain the following information on rotational crops:

'Treated areas may be replanted immediately following harvest or as soon as practical following the last application with *Brassica* (Cole) leafy vegetables (crop group 5), cucurbit vegetables (crop group9), fruiting vegetables (crop group 8), leafy vegetables (crop group 4),tuberous and corm vegetables (crop group 1C), *root vegetables (crop group 1),* bulb vegetables (crop group 3), cotton, sunflower, oilseed crops (rapeseed, Indian rapeseed, Indian mustard seed, field mustard seed, black mustard seed, flax seed, safflower seed, crambe seed and borage seed), blueberries, and strawberries.

30 –Day Plant Back Interval:
Alfalfa, legume vegetables (crop group 6), cereal grains (crop group 15), grass forage, fodder and hay (crop group 17), peanuts.

For all other crops, a 120-day plant-back interval must be observed.'

Based on the rotational field trial studies provided by DuPont, root and tuber vegetables (crop group 1) must be moved to the 30-day plant back interval to cover the leaves (crop group 2 inadvertent tolerance at 30 day PBI). The following commodities may be added to the 30 day plantback interval: foliage of legume vegetables (crop group 7), legume vegetables (crop group

6), forage, fodder and straw of cereal grains (crop group 16), nongrass animal feeds (crop group 18). Note that crop group 18 includes alafalfa.

For all other crops, the plant-back interval must be changed from 120 days to 1 year. This is consistent with the DuPont label.

Conclusions.

The draft labels are adequate to allow evaluation of the residue data (field trial bridging data) relative to the proposed uses.

The rotational crop restrictions must be amended, as follows:

(1) Root and tuber vegetables (crop group 1) must be listed as a 30-day plant back interval (not immediate plantback).

(2) The following commodities may be added to the 30-day plantback interval: foliage of legume vegetables (including soybeans) (crop group 7), legume vegetables (crop group 6), forage, fodder and straw of cereal grains (crop group 16), nongrass animal feeds (crop group 18).

(3) The plantback interval for all crops not otherwise specified must be changed from 120 days to 1 year. This is consistent with the DuPont labels.

Nature of the Residue (860.1300/1850)

This guideline requirement has been addressed in D407961 (S. Funk, 01/28/2013).

Residue Analytical Methods (860.1340)

This guideline requirement has been addressed in D407961 (S. Funk, 01/28/2013).

Multiresidue Methods (860.1360)

This guideline requirement has been addressed in D407961 (S. Funk, 01/28/2013).

Storage Stability (860.1380)

See D407961 (S. Funk, 01/28/2013) for summary and analysis of storage stability studies on five crop commodity types.

Table 5: Summary of Storage Conditions and Durations for Syngenta Crop Field Trials

Matrix	Storage Temperature (°C)	Longest Actual Storage Interval		Interval of Demonstrated Storage Stability
	Analytical Facility	Days	Months	Months
Apple	-10±10	- - -	4.8 7.1 5.7	High water content commodities (apple): 24 months for all analytes
Leaf lettuce	-10±10	-	3.3 4.2 3.1	High water content commodities (apple): 24 months for all analytes
Cantaloupe	-10±10	-	4.8 5.8 10.8 1.6 2.1 0.5	High water content commodities (apple): 24 months for all analytes
Cabbage	<-10 (±5°C)	-	6.7 3.6 1.7	High water content commodities (apple): 24 months for all analytes
Mustard greens	<-10 (±5°C)	-	4.1 5.8 4.8	High water content commodities (apple): 24 months for all analytes
Cucumber (2009)	<-20 (±10°C)	-	0.6 5.3 1.1	High water content commodities (apple): 24 months for all analytes
Cucumber (2011)	-20±10	-	7.0 7.0 7.0	High water content commodities (apple): 24 months for all analytes
Spinach	<-20 (±10°C)	-	3.7 3.2 3.3	High water content commodities (apple): 24 months for all analytes
Non-Bell (Hot) Pepper	<-20 (±10°C)	-	9.2 10.8 6.2	High water content commodities (apple): 24 months for all analytes
Head Lettuce	-20±10	-	2.6 8.9 8,7	High water content commodities (apple): 24 months for all analytes
Bell Pepper	-20±10	-	3.6 6.3 2.9	High water content commodities (apple): 24 months for all analytes
Summer squash	-20±10	-	4.7 5.1	High water content commodities (apple): 24 months for all analytes
Tomato	-20±10	-	3.5 6.3 3.2	High water content commodities (apple): 24 months for all analytes

Conclusion

All commodities from field trials addressed herein were stored frozen prior to analysis for storage intervals less than those of demonstrated storage stability (for five representative crop commodity types). Therefore, residue values (cyantraniliprole) do not require correction for stability of the residue.

Water, Fish, and Irrigated Crops (860.1400)

This Guideline is not relevant to the application.

Food Handling (860.1460)

This Guideline is not relevant to the application.

Meat, Milk, Poultry, and Eggs (860.1480)

This guideline requirement has been addressed in D407961 (S. Funk, 01/28/2013).

Conclusion

Nothing in the present application will alter the dietary burdens of livestock or effect the determination of livestock commodity residue levels. Residues from use of the WG formulation of specific commodities are no higher than residues from use of the DuPont formulations. The seed treatment uses are already included in similar DuPont uses.

Crop Field Trials (860.1500)

Reference: B.7.6 Residues From Supervised Trials in NAFTA Region

The extensive crop field trials for first food/feed use of cyantraniliprole are summarized in D407961 (S. Funk, 01/28/2013).

Cyantraniliprole is the major component of the residues in raw agricultural crop commodities, although multiple analytes were determined for the field trial commodities. These metabolites were generally <0.01 ppm. Formulation bridging trials on a representative group of crops have shown comparable residues between formulation OD and WG formulation when applied foliarly. Soil applications of the WG formulation to a representative group of crops have shown consistently lower residue levels than foliar applications of the WG formulation, when applied according to the proposed label use patterns.

<u>Bridging of DuPont OD and Syngenta WG Formulations</u>

<u>Pome Fruit (Apple)</u>

Reference: MRID 48432514

This study determined cyantraniliprole (DPX HGW86) and metabolite residues in/on apple following treatment with Cyantraniliprole Insecticide during the 2009 growing season. To support the registration of its WG formulation, Syngenta performed three side-by-side bridging trials to compare its solo wettable granular (WG) formulation of cyantraniliprole to the solo oil

dispersion (OD) cyantraniliprole formulation. The side-by-side formulation bridging study design included three foliar applications at an average rate of 150 g ai/ha per application with a 7-day retreatment interval (RTI) for an approximate total rate of 450 g ai/ha. Samples were collected at a 3-day preharvest interval (PHI).

DuPont Method 15736, liquid chromatography with tandem mass spectrometry (LC-MS/MS), was used to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on apples. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on apples were 94 and 94-96% for cyantraniliprole, respectively; and 84-99% and 91-98% for its metabolites.

Table 6. Summary of Bridging Trial Residue Data for Apple

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n[2]	Min.	Max.	HAFT	Median	Mean	Std. Dev.
Cyantraniliprole									
Apple/Foliar (A15929B- 100 OD)	446-452	3	3	0.20	0.41	0.35	0.31	0.29	0.08
Apple/Foliar (A16971B- 40 WG)	446-454	3	3	0.23	0.6	0.38	0.33	0.31	0.08
IN-J9Z38									
Apple/Foliar (A15929B- 100 OD)	446-452	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Apple/Foliar (A15929B- 100 OD)	446-452	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Apple/Foliar (A15929B- 100 OD)	446-452	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Apple/Foliar (A15929B- 100 OD)	446-452	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Apple/Foliar (A15929B- 100 OD)	446-452	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--

IN-N7B69									
Apple/Foliar (A15929B- 100 OD)	446-452	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] End Use Product
[2] Three replicate samples were taken at each of three independent trial sites, with one plot at each site. Maximum is the maximum value encountered over all analyzed samples

Conclusions
Application of a DuPont® oil dispersion (OD) formulation and a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications at an average rate of 150 g ai/ha per application with a 7 day retreatment interval (RTI) and a pre-harvest interval (PHI) of 3 days resulted in average residues of cyantraniliprole in or on apples of 0.29±0.08 ppm, and 0.31±0.08 ppm, respectively. Although the WG formulation had a higher residue value, the medians, means, and HAFTs of the two formulations were very similar, and the highest residue from the WG formulation (0.6 ppm) is covered by the recommended pome fruit tolerance (1.5 ppm). Therefore, the formulations are equivalent for the tested use pattern.

Leafy Vegetables (Lettuce)

Leaf Lettuce

Reference: MRID 48432515

Syngenta conducted three bridging crop field trials in/on leaf lettuce during the 2009 growing season in California with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 146-155 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 136-292 L/ha for a maximum seasonal rate of 448-464 g ai/ha/season. Three plots were maintained for each formulation at each trial site. Single samples were collected at a PHI of 1 day.

DuPont Method 15736, LC-MS/MS, was used to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on leaf lettuce. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 5.0 ppm in/on leaf lettuce were 94 and 93% for cyantraniliprole, respectively; and 87-109% and 82-102% for its metabolites.

Table 7. Summary of Bridging Trial Residue Data for Leaf Lettuce

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n[2]	Min.	Max.	HAFT	Median	Mean	Std. Dev.
Cyantraniliprole									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	1.1	4.5	4.3	3.1	3.0	1.3

Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	1.2	4.6	4.1	2.6	2.7	1.2
IN-J9Z38									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	0.022	0.019	0.010	0.013	0.005
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	0.026	0.020	0.010	0.013	0.006
IN-JCZ38									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	0.027	0.024	0.010	0.015	0.007
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	0.025	0.021	0.010	0.014	0.006
IN-MYX98									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	0.011	0.011	<0.01	0.01	0.0004
IN-N7B69									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] End Use Product
[2] Three replicate plots were treated at each independent trial site. Each replicate was treated as independent.

Head Lettuce

Reference: MRID 48758902

Syngenta conducted three crop field trials in/on head lettuce (GA, CA, FL) during the 2011 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 150 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 193-293 L/ha for a maximum seasonal rate of 450 g ai/ha/season. Three plots for each application scenario were maintained at each trial site. Samples were collected at the normal commercial harvest date of 1 day.

DuPont Method 15736, LC-MS/MS, was used to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on head lettuce. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 5.0 ppm in/on head lettuce were 111 and 106% for cyantraniliprole, respectively; and 104-116% and 99-110% for its metabolites.

Table 8. Summary of Bridging Residue Trial Data in/on Head Lettuce.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n[1]	Min.	Max.	HAFT	Median	Mean	Std. Dev.
Cyantraniliprole									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	0.62	1.55	1.35	1.09	1.07	0.35
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	0.31	1.96	1.49	1.19	1.09	0.59
IN-J9Z38									
Head Lettuce /Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] n = number of plot samples, with 3 plots at each of 3 trial sites.

Conclusions

Application of a DuPont® oil dispersion (OD) formulation and a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications at about 450 g ai/ha/season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on leaf lettuce at 3.0±1.3 ppm, and 2.7±1.2 ppm, respectively, and average residues of cyantaniliprole in or on head lettuce at 1.07±0.35 ppm and 1.09±0.59 ppm, respectively. The HAFTs in each case were very similar. The use of the WG formulation is covered by the recommended tolerance of 20 ppm resulting from evaluation of DuPont uses on leafy vegetables. Therefore, the formulations are equivalent for the tested use pattern.

Cucurbit Vegetables

Cantaloupe

Reference: MRID 48432516

Syngenta conducted seven crop field trials in/on cantaloupes during the 2009-2010 growing season in California with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). In the three 2009 trials, at each trial site three plots for each of the OD and WG formulations were setup and one sample per plot was collected for a total of three samples per formulation per trial site. In the four 2010 trials, each trial consisted of one OD and one WG plot, with three samples collected per plot for a total of three samples per formulation per trial. Three foliar applications were made each at 147-154 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 183-341 L/ha for a maximum seasonal rate of 446-462 g ai/ha/season. Samples were collected at the normal commercial harvest date of 1 day.

DuPont Method 15736, LC-MS/MS, was used to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on cantaloupe. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on cantaloupes were 91-109% and 91-103% for cyantraniliprole, respectively; 88-114% and 82-116% for its metabolites.

Table 9. Summary of Bridging Residue Trial Data for Cantaloupe

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n[2]	Min.	Max.[2]	HAFT*	Median	Mean	Std. Dev.
Cyantraniliprole									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	0.0 14	0.35	0.31	0.078	0.13	0.11

Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	0.021	0.46	0.36	0.13	0.16	0.11
IN-J9Z38									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	0.015	0.014	<0.01	0.011	0.001
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	0.015	0.014	<0.01	0.011	0.002
IN-JCZ38									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	0.011	.011	<0.01	0.010	0.0003
IN-N7B69									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] End use product.
[2] n = number of samples or number of plots. Replicate samples per plot were averaged. Replicate plots (of a given trial) were not averaged.
[3] Maximum is the greatest result found across all analyses.

Summer Squash

Reference: MRID 48758904

Syngenta conducted three crop field trials (PA, GA, CA) in/on summer squash during the 2011 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 150 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 141-245 L/ha for a maximum seasonal rate

of 450 g ai/ha/season. Three plots were maintained for each application scenario at each trial location. Samples were collected at the normal commercial harvest date of 1 day.

DuPont Method 15736, LC-MS/MS, was used to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on summer squash. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on summer squash were 94 and 90% for cyantraniliprole, respectively; and 66-98% and 75-99% for its metabolites.

Table 10. Summary of Bridging Trial Residue Data in/on Summer Squash.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n [1]	Min.	Max.	HAFT*	Median	Mean	Std. Dev.
Cyantraniliprole									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	0.02	0.11	0.09	0.04	0.06	0.03
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	0.03	0.16	0.13	0.05	0.07	0.04
IN-J9Z38									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

Table 10. Summary of Bridging Trial Residue Data in/on Summer Squash.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n [1]	Min.	Max.	HAFT*	Median	Mean	Std. Dev.
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] n = number of plot samples, with 3 plots at each of 3 trial sites.

Cucumber

Reference: MRID 48758903

Syngenta conducted three crop field trials (GA, WI, CA) in/on cucumbers during the 2011 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 150 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 170-313 L/ha for a maximum seasonal rate of 450 g ai/ha/season. Samples were collected at the normal commercial harvest date of 1 day

DuPont Method 15736, LC-MS/MS, was used to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on cucumbers. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on cucumber were 100 and 94% for cyantraniliprole, respectively; and 97-101% and 86-100% for its metabolites.

Table 11. Summary of Bridging Trial Residue Data in/on Cucumbers.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n [1]	Min.	Max.	HAFT	Median	Mean	Std. Dev.
Cyantraniliprole									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	0.02	0.09	0.08	0.07	0.06	0.03
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	0.03	0.09	0.07	0.06	0.06	0.02
IN-J9Z38									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									

Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] n = number of plot samples, with 3 plots at each of 3 trial sites.

Conclusions

Application of a DuPont® oil dispersion (OD) formulation and a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications in the range of 446-462 g ai/ha/season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on cantaloupe at 0.13±0.11 ppm, and 0.16±0.11 ppm, respectively. Application of a DuPont® oil dispersion (OD) formulation and from a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications of 450 g ai/ha/season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on summer squash at 0.06±0.03 ppm, and 0.07±0.04 ppm, respectively. Application of a DuPont® oil dispersion (OD) formulation and a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications of 450 g ai/ha/season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on cucumbers at 0.06±0.03 ppm, and 0.06±0.02 ppm, respectively. The HAFTs and maximum values were very similar in each case. Geographic distribution was limited (California only) for cantaloupe, but trials were run in two different years. The use of the WG formulation is covered by the recommended tolerance of 0.4 ppm resulting from evaluation of DuPont uses (OD) on cucurbit vegetables. Therefore, the formulations are equivalent for the tested use pattern.

Fruiting Vegetables

Bell pepper

Reference: MRID 48758906

Syngenta conducted three crop field trials (GA, FL, CA) in/on bell pepper during the 2011 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 150 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 201-291 L/ha for a maximum seasonal rate of 450 g ai/ha/season. Three plots were maintained for each application scenario at each trial location. Samples were collected at the normal commercial harvest date of 1 day.

DuPont Method 15736, LC-MS/MS, was used to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on bell peppers. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on bell peppers were 89 and 83% for cyantraniliprole, respectively; and75-97% and 79-95% for its metabolites.

Table 12. Summary of Bridging Trial Residue Data in/on Bell Pepper.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n [1]	Min.	Max.	HAFT	Median	Mean	Std. Dev.
Cyantraniliprole									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	0.09	0.44	0.37	0.31	0.26	0.12
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	0.06	0.43	0.37	0.27	0.25	0.11
IN-J9Z38									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									

Table 12. Summary of Bridging Trial Residue Data in/on Bell Pepper.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n [1]	Min.	Max.	HAFT	Median	Mean	Std. Dev.
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] n = number of plot samples, with 3 plots at each of 3 trial sites.

Tomato

Reference: MRID 488758905

Syngenta conducted three crop field trials (PA, FL, CA) in/on tomatoes during the 2011 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 150 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 182-295 L/ha for a maximum seasonal rate of 450 g ai/ha/season. Three plots were maintained for each application scenario at each trial site. Samples were collected at a PHI of 1 day.

DuPont Method 15736, LC-MS/MS, was used to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on tomatoes. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on cucumber were 103 and 114% for cyantraniliprole, respectively; and 89-108% and 99-115% for its metabolites.

Table 13. Summary of Bridging Trial Residue Data in/on Tomatoes.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n [1]	Min.	Max.	HAFT*	Median	Mean	Std. Dev.
Cyantraniliprole									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	0.06	0.21	0.18	0.11	0.13	0.05

Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	0.06	0.27	0.23	0.12	0.14	0.08
IN-J9Z38									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] n = number of plot samples, with 3 plots at each of 3 trial sites

Conclusion

Application of a DuPont® oil dispersion (OD) formulation and a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications of 450 g ai/ha/season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on bell peppers at 0.26±0.12 ppm, and 0.25±0.11 ppm, respectively.

Application of a DuPont® oil dispersion (OD) formulation and a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications of 450 g ai/ha/season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on tomatoes at 0.13±0.05 ppm, and 0.14±0.08 ppm, respectively. The use of the WG formulation is covered by the recommended tolerance of 2 ppm resulting from evaluation of DuPont uses (OD/SE) on fruiting vegetables. Therefore, the formulations are equivalent for the tested use

pattern.

Comparison of Soil and Foliar Application Methods for the WG formulation

A side-by-side application method comparison study utilizing the Syngenta WG formulation was performed to determine the contributions of soil and foliar applications to the magnitude of the residue. The study was performed on five crops to cover the various crop groups (i.e. spinach for the leafy vegetable group (except *Brassica*), cabbage and mustard greens for the *Brassica* vegetable group, hot pepper for the fruiting vegetable group, and cucumbers for the cucurbit vegetable group). Three trials were conducted for each crop type in diverse agricultural regions.

The study design involved three treatments. The first treatment was a solo soil application (drench and/or shank depending on the crop) at an application rate of 200 g ai/ha with a 30 day PHI. The second treatment involved both soil and foliar applications. A single soil application at a rate of 200 g ai/ha with a 30 day PHI was followed by a foliar application of 100 g ai/ha with a 6 day PHI and another foliar application at a rate of 150 g ai/ha with a 1 day PHI. The third treatment involved three foliar applications at a rate of 150 g ai/ha per application with an 11, 6, and 1 day PHI.

The soil application of the WG cyantraniliprole formulation resulted in residues below 0.01 ppm which is the limit of quantitation (LOQ). Based on the data, the highest residues were observed in treatment three, the three foliar applications at a rate of 150 g ai/ha per application. A comparison of the cyantraniliprole residues is presented in Table 9.

Table 14. Summary Comparison of Soil, Soil + Foliar, and Foliar Application Residue Data for Cyantraniliprole

Commodity (n = no. Trials)	Average Residue Rates (ppm)*		
	Soil (200 g ai/ha) Cyantraniliprole (ppm)	Soil + 2 Foliar (200 + 100 + 150 g ai/ha) Cyantraniliprole (ppm)	3 Foliar (3 x 150 g ai/ha) Cyantraniliprole (ppm)
Hot pepper (n = 3, regions 8, 10, 10)	<LOQ (0.01 ppm)	0.19	0.35
Cabbage (n=3, regions 1, 5, 100)	<LOQ (0.01 ppm)	0.52	0.62
Mustard greens (n =3, regions 2, 5, 10)	<LOQ (0.01 ppm)	6.3	8.7
Spinach (n = 3; regions 2, 6, 10)	<LOQ (0.01 ppm)	5.5	6.8
Cucumber (n =3, regions 2, 5, 10)	<LOQ (0.01 ppm)	0.07	0.08

Cabbage and Mustard Greens

Reference: MRID 48432517

Syngenta conducted three crop field trials each in/on cabbage and mustard greens during the 2009 and 2010 growing seasons in the United States with a side-by-side comparison of soil

applications (drench or shank), and foliar applications using Syngenta water dispersible granules (40 WG- A16971B). The first treatment was a solo soil application (drench or shank) at an application rate of 200 g ai/ha with a 30 day PHI and a spray volume of 94-1122 L/ha. The second treatment involved both soil and foliar applications. A single soil application at a rate of 200 g ai/ha with a spray volume of 94-1122 L/ha and a retreatment interval of 24 days was followed by a foliar application of 100 g ai/ha with a spray volume of 47-374 L/ha at a retreatment interval of 5 days and another foliar application at a rate of 150 g ai/ha with a spray volume of 47-374 L/ha. Samples were collected at the normal commercial harvest date of 1 day. The third treatment involved three foliar applications at a rate of 150 g ai/ha per application at a retreatment interval of 5 days with a spray volume of 47 to 374 L/ha. Samples were collected at the normal harvest date of 1 day.

DuPont Method 15736, LC-MS/MS, is suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on cabbage and mustard greens. The procedural recoveries reported from spiking cabbage at levels of 0.01 ppm (i.e. method LOQ), 1.0 ppm, and 2.0 ppm were between 78 and 112% for cyantraniliprole and its metabolites. The procedural recoveries reported from spiking mustard greens at levels of 0.01 ppm (i.e. method LOQ), 10 ppm, and 12.0 ppm were between 81 and 100% for cyantraniliprole and its metabolites.

Table 15: Summary of Bridging Trial Residue Data in/on Cabbage and Mustard Greens

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI[a] (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
CABBAGE (A16971B- 40 WG)									
Cyantraniliprole									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	10	0.085	3.0	1.3	0.26	0.69	0.93
3 Foliar	447-449	1	10	0.13	1.5	1.5	0.34	0.52	0.51
IN-N7B69									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-J9Z38									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

a PHI: Pre-harvest interval
b HAFT: Highest Average Field Trial Value

Cucumber

Reference: MRID 48432520

Syngenta conducted three crop field trials (GA, CA, IA) each in/on cucumbers during the 2009 and 2010 growing seasons in the United States with a side-by-side comparison of soil applications (drench), and foliar applications using Syngenta water dispersible granules (40 WG-A16971B). The first treatment was a drench soil application at 199-201 g ai/ha/season with a 30 day PHI and a spray volume of 678-845 L/ha. The second treatment involved a soil (24-day retreatment interval) and 2 foliar applications (5-day retreatment interval, RTI) for a total of 446-449 g ai/ha/season (0.398 – 0.401 lb ai/a/season) with a spray volume of 153-224 L/ha. Samples were collected at the normal commercial harvest date of 1 day. The third treatment involved three foliar applications (5-day retreatment interval) at a rate of 450-455 g ai/ha/season with a spray volume of 154 to 233 L/ha. Samples were collected at the normal harvest interval of 1 day.

DuPont Method 15736, LC-MS/MS, was used to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on cucumbers. The procedural recoveries reported from spiking cucumbers at levels of 0.01 ppm (i.e. method LOQ), 0.1 ppm, and 1.0 ppm were between 70 and 120% for cyantraniliprole and its metabolites.

Table 16: Summary of Bridging Trial Residue Data in/on Cucumbers.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI[a] (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
CUCUMBERS (A16971B- 40 WG)									
Cyantraniliprole									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	0.049	0.085	0.080	0.063	0.065	0.014
3 Foliar	450-455	1	6	0.060	0.107	0.099	0.071	0.077	0.019
IN-N7B69									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-J9Z38									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

[a] PHI: Pre-harvest interval
[b] HAFT: Highest Average Field Trial Value

Spinach

Reference: MRID 48432519

Syngenta conducted three crop field trials (GA, TX, CA) each in/on spinach during the 2009 growing seasons in the United States with a side-by-side comparison of soil applications (drench), and foliar applications using Syngenta water dispersible granules (40 WG- A16971B). The first treatment was a drench soil application at 200-203 g ai/ha/season with a 30 day PHI and a spray volume of 282-592 L/ha. The second treatment involved a soil application (24-day retreatment interval) and 2 foliar applications (5-day retreatment) for a total of 452-457 g ai/ha/season (0.403 – 0.408 lb ai/acre/season) with a spray volume of 188-589 L/ha. Samples were collected at the normal commercial harvest date of 1 day. The third treatment involved three foliar applications (5-day retreatment interval) at a rate of 448-472 g ai/ha/season with a spray volume of 183 to 287 L/ha. Samples were collected at the normal harvest date of 1 day.

DuPont Method 15736, LC-MS/MS, was used to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on spinach. The procedural recoveries reported from spiking spinach at levels of 0.01 ppm (i.e. method LOQ), and 10 ppm were between 70 and 120% for cyantraniliprole and its metabolites.

Table 17: Summary of Bridging Trial Residue Data in/on Spinach.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI [a](days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
SPINACH (A16971B- 40 WG)									
Cyantraniliprole									
1 Soil Application	200-203	30	6	<0.01	0.016	0.014	0.01	0.011	0.003
1 Soil + 2 Foliar	452-457	1	6	3.9	6.8	6.6	5.8	5.5	1.2
3 Foliar	448-473	1	6	4.6	9.0	9.0	6.7	6.8	1.9
IN-N7B69									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	452-457	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	448-473	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	452-457	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	448-473	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	452-457	1	6	0.043	0.12	0.11	0.052	0.07	0.001
3 Foliar	448-473	1	6	0.081	0.18	0.18	0.090	0.12	0.047
IN-MLA84									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

1 Soil + 2 Foliar	452-457	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	448-473	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-J9Z38									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	452-457	1	6	0.024	0.028	0.027	0.026	0.026	0.001
3 Foliar	448-473	1	6	0.033	0.044	0.040	0.037	0.038	0.004
IN-K7H19									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	452-457	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	448-473	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

[a] PHI: Pre-harvest interval
[b] HAFT: Highest Average Field Trial Value

Non-Bell (Hot) Peppers

Reference: MRID 48432518

Syngenta conducted three crop field trials (TX, CA, CA) each in/on hot peppers during the 2009 growing seasons in the United States with a side-by-side comparison of soil applications (drench), and foliar applications using Syngenta water dispersible granules (40 WG- A16971B). The first treatment was a drench soil application at 198-203 g ai/ha/season with a 30 day PHI and a spray volume of 142-838 L/ha. The second treatment involved a soil application (24-day RTI) and 2 foliar applications (5-day RTI) for a total of 447-450 g ai/ha/season (0.399 – 0.402 lb ai/acre/season) with a spray volume of 139-842 L/ha. Samples were collected at the normal commercial harvest date of 1 day. The third treatment involved three foliar applications (5-day retreatment interval) at a rate of 446-458 g ai/ha/season with a spray volume of 149 to 229 L/ha. Samples were collected at the normal harvest interval of 1 day.

DuPont Method 15736, LC-MS/MS, was used to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on hot peppers. The procedural recoveries reported from spiking hot peppers at levels of 0.01 ppm (i.e. method LOQ), 0.5 ppm, and 1.0 ppm were between 70 and 120% for cyantraniliprole and its metabolites.

Table 18: Summary of Trial Residue Bridging Data in/on Hot Peppers.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI[a] (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
HOT PEPPERS (A16971B- 40 WG)									
Cyantraniliprole									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	0.053	0.32	0.30	0.22	0.19	0.11
3 Foliar	446-458	1	14	0.13	0.80	0.77	0.34	0.41	0.22
IN-N7B69									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-J9Z38									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

[a] PHI: Pre-harvest interval
[b] HAFT: Highest Average Field Trial Value

Conclusion
Foliar application of the WG formulation consistently results in residues greater than those from a single soil application, both application methods conducted according to the proposed label. Therefore, tolerances based on foliar uses will encompass the soil treatment use.

Seed Treatment Use (Potato, Sunflower)

Syngenta has proposed a potato piece treatment at a maximum rate of 0.20 lb ai/acre to 0.47 lb ai/acre corresponding to seeding rates of 1500 lbs/acre to 3500 lbs/acre. The rate for a planting density of 2000 lbs/acre is about 0.28 lb ai/acre. The DuPont trials (n = 21) were conducted at a rate of 13.5 g ai/100 kg of seed with 2200 kg seed/ ha (2000 lbs seed/acre) planting density (approximately 0.268 lb ai/A or 300 g ai/ha). The field trial data do support the Syngenta proposed use pattern.

Syngenta has proposed a sunflower seed treatment with cyantraniliprole at a maximum rate of 0.2 lb ai/cwt seed. The supporting field trials (DuPont) were conducted with canola seed treated at 0.070 lb ai/acre. The DuPont label specifies a maximum of 1 lb ai/cwt for canola (rapeseed) seed or mustard seed. (Assuming an average of 6 lbs canola seed per acre maximum planting rate (OK State University), 1 lb ai/cwt is 0.06 lb ai/acre. This is slightly less than the field trial rate.) The canola seed treatment data may be translated to sunflower. Both are oilseeds. The proposed Syngenta rate is less than the DuPont rate and would therefore be covered by the DuPont field trial data.

Processed Food and Feed (860.1520)

This guideline requirement has been addressed in D407961 (S. Funk, 01/28/2013).

Conclusions.
Appropriate processed commodity processing factors and tolerances were determined for the

DuPont uses (D407961, S. Funk, 12/28/2013). Nothing in the present submission alters those determinations.

Rotational Crops (Field; 860.1900)

This guideline requirement has been addressed in D407961 (S. Funk, 01/28/2013).

Conclusions.
Appropriate rotational crop tolerances and plant back intervals were determined for the DuPont uses (D407961, S. Funk, 12/28/2013). Nothing in the present submission alters those determinations.

Tolerance Derivation

Reference: D407961 (S. Funk, 01/28/2013).

This guideline requirement has been addressed in D407961 (S. Funk, 01/28/2013).

Recommended tolerances for cyantraniliprole were determined for the DuPont petition (D407961, S. Funk, 01/28/2013). These tolerances will cover the uses for the WG formulations now proposed by Syngenta. Residues from uses of these formulations are demonstrated by bridging trials to be no greater than residues from the same uses of the DuPont formulations (OD, SE). The FS formulation use as a seed treatment for potato and sunflower are similar to DuPont uses for potato and canola. Therefore, no tolerance modifications are needed.

See D407961 for information on harmonization of tolerances/MRLs with Canada and Codex.

Primary Evaluator _____ Date: 01/31/2013
Stephen Funk, Senior Scientist, RAB III

Approved by _____ Date:01/31/2013
Jeff Dawson, Acting Branch Chief, RAB III

Attached in OECD format are the Syngenta bridging field trials for apple, leaf lettuce, cantaloupe, non-bell pepper, cabbage, mustard greens, spinach, cucumber, tomato, potato, MRIDs 48432514 – 48432520.

B.7.6.1.6 – B.7.6.1.12 SYNGENTA CROP FIELD TRIALS FROM NAFTA REGIONS

OCSPP 860.1500
MRIDs 48432514 – 48432520

Formulation bridging trials: apples, leaf lettuce, cantaloupes
Application method bridging trials: hot peppers, cabbage, mustard greens, spinach, cucumbers
SC and WG Canadian formulation bridging trials: cucumbers, tomatoes, mustard greens, potatoes

IIIA.7.6.1.Residues Resulting from Supervised Field Trials

IIIA 7.6.1.6

USA Apple Cyantraniliprole OD and WG Formulations Residue Bridging Study

Report	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Apple from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations
Author	Johanna Mazlo
Report No.	T000811-09
Document No.	PMRA No. 2071318. MRID 48432514
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

This study determined cyantraniliprole (DPX HGW86) and metabolite residues in/on apple in the United States following treatment with Cyantraniliprole Insecticide during the 2009 growing season. To support the registration of its WG formulation, Syngenta performed a side-by-side bridging study to compare its solo wettable granular (WG) formulation of cyantraniliprole to the solo oil dispersion (OD) cyantraniliprole formulation. The side-by-side formulation bridging study design included three foliar applications at an average rate of 150 g ai/ha per application with a 7-day retreatment interval (RTI) for an approximate total rate of 450 g ai/ha. Samples were collected at the normal commercial harvest date of 3 days. The number of trials and the geographical locations are given in Table 1. The study use pattern is given in Table 2. An adjuvant was added to the spray mixture according to the manufacturer's label.

Table 1: Trial Locations for Apples

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
W32-9621	10	Sanger, California/USA/2009	Bridging MOR	field
W28-9622	10	Kerman, California/USA/2009	Bridging MOR	field
W23-9623	10	near Los Molinos, California/USA/2009	Bridging MOR	field

Table 2. Study Use Pattern for Apples.

Test ID (City, State/Region, Country, /Year)	EP[a]	Application						Tank Mix Adjuvants
		Method/Timing[b]	Crop Growth Stage	Vol (L/ha)	Application Rate (g ai/ha)[c]	RTI[d] (days)	Total Rate[e] (g ai/ha)	
W32-9621 (Sanger, CA, Region 10 USA, 2009)	A15929B (100 OD)	Foliar broadcast/ 17 DBH	BBCH 83	921	153	7	452	Pro 90 0.25% v/v
		Foliar broadcast/ 10 DBH	BBCH 85	889	149	7		
		Foliar broadcast/ 3 DBH	BBCH 89	919	150	--		
	A16971B (40 WG)	Foliar broadcast/ 17 DBH	BBCH 83	920	152	7	454	Pro 90 0.25% v/v
		Foliar broadcast/ 10 DBH	BBCH 85	895	151	7		
		Foliar broadcast/ 3 DBH	BBCH 89	926	151	--		
W28-9622 (Kerman, CA, Region 10 USA, 2009)	A15929B (100 OD)	Foliar broadcast/ 17 DBH	Mature fruit	753	151	7	446	Induce 0.5% v/v
		Foliar broadcast/ 10 DBH	Mature fruit	743	148	7		
		Foliar broadcast/ 3 DBH	Mature fruit	738	147	--		
	A16971B (40 WG)	Foliar broadcast/ 17 DBH	Mature fruit	760	152	7	446	Induce 0.5% v/v
		Foliar broadcast/ 10 DBH	Mature fruit	741	148	7		
		Foliar broadcast/ 3 DBH	Mature fruit	737	147	--		
W23-9623 (near Los Molinos, CA, Region 10 USA, 2009)	A15929B (100 OD)	Foliar broadcast/ 17 DBH	17 DBH	847	148	7	450	R-11 0.0125% v/v
		Foliar broadcast/ 10 DBH	10 DBH	847	151	7		
		Foliar broadcast/ 3 DBH	3 DBH	851	151	--		
	A16971B (40 WG)	Foliar broadcast/ 17 DBH	17 DBH	851	151	7	452	R-11 0.0125% v/v
		Foliar broadcast/ 10 DBH	10 DBH	847	150	7		
		Foliar broadcast/ 3 DBH	3 DBH	852	151	--		

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient; [b] DBH = Days before harvest

[c] The application rate (g ai/ha) is a nominal rate; [d]Retreatment Interval; [e]Total rate is based on the nominal application rate.

II. Results and Discussion

The analytical method is described briefly in Table 3. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on apples. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on apples were 94 and 94-96% for cyantraniliprole, respectively; 84-99% and 91-98% for its metabolites, respectively as per Table 4. The chromatograms of control samples of apples are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27749) supports the storage durations/conditions of samples in the apple side-by-side formulation bridging field trials reported in Table 5. No corrections to residues due to in-storage dissipation are necessary. Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the apple side-by-side formulation bridging field trials with cyantraniliprole (100 OD and 40 WG) are reported in Table 6. A summary of residue data with both formulations is presented in Table 7.

The maximum residue values of cyantraniliprole for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 0.41 ppm, and 0.60 ppm, respectively. Residue values for all metabolites were less than the LOQ (0.01 ppm) for both the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG). Residue decline data were not submitted with the study. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 3: Analytical Methodology

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Apple samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Genogrinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One ml of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: Phenomenex Synergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSystems/MDS Sciex API 5000 mass spectrometer (MS/MS)
LOQ	0.010 mg/kg

Table 4: Summary of Concurrent Recoveries of Cyantraniliprole from Apple.

Matrix	Spiking level in ppm (mg/kg)	Sample size (n)	Recoveries (%)	Mean ± SDEV(CV) (%)
Cyantraniliprole				
Apple	0.01	1	94	NA
	1.0	2	96, 94	95±1.4(1.5)
IN-N7B69				
Apple	0.01	1	90	NA
	1.0	1	94	NA
IN-JCZ38				
Apple	0.01	1	96	NA
	1.0	1	98	NA
IN-MYX98				
Apple	0.01	1	97	NA
	1.0	1	94	NA
IN-MLA84				
Apple	0.01	1	89	NA
	1.0	1	93	NA
IN-J9Z38				
Apple	0.01	1	84	NA
	1.0	1	91	NA
IN-K7H19				
Apple	0.01	1	99	NA
	1.0	1	93	NA

Table 5: Summary of Storage Conditions

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)

W32-9621 (CA/2009)	Control	Apple	-10±10	4.8
	Cyantraniliprole 100 OD			4.8
	Cyantraniliprole 40 WG			4.8
W32-9622 (CA/2009)	Control	Apple	-10±10	7.1
	Cyantraniliprole 100 OD			5.9
	Cyantraniliprole 40 WG			5.9-7.1
W32-9623 (CA/2009)	Control	Apple	-10±10	5.7
	Cyantraniliprole 100 OD			5.7
	Cyantraniliprole 40 WG			5.7

Table 6: Cyantraniliprole Apple Residue Results

Test ID	EP[a]	Crop/ Variety	Total Rate (g ai/ha)	DAA /PHI[b] (days)	Residues (ppm)						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
W32-9621 (Sanger, CA, Region 10 USA, 2009)	None	Apple/ Fuji	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929 B (100 OD)		452	3	0.33	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.31	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.30	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.31	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971 B (40 WG)		454	3	0.38	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.33	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.33	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
W28-9622 (Kerman, CA, Region 10 USA, 2009)	None	Apple/ Gala	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929 B (100 OD)		446	3	0.33	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.41	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.31	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.35	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971 B (40 WG)		446	3	0.60 0.50[e] 0.48[e] 0.49[e] (0.52)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.32	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.30	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.38	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
W23-9623 (near Los Molinos, CA, Region 10 USA, 2009)	None	Apple/ Summerfeld	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929 B (100 OD)		450	3	0.35	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.19	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.075	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.20	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971 B (40 WG)		452	3	0.22	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.25	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				3	0.22	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.23	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient; [b] DAA = Days After Application (indicates nominal number of days between last application and sampling). Application timings and PHI timings may vary. [e] Confirmatory analysis of parent

Table 7. Summary of Residue Bridging Trial Data in/on Apples.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT*	Median	Mean	Std. Dev.
Cyantraniliprole									
Apple/Foliar (A15929B- 100 OD)	446-452	3	3	0.20	0.41	0.35	0.31	0.29	0.08
Apple/Foliar (A16971B- 40 WG)	446-454	3	3	0.23	0.6	0.38	0.33	0.31	0.08
IN-J9Z38									
Apple/Foliar (A15929B- 100 OD)	446-452	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Apple/Foliar (A15929B- 100 OD)	446-452	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Apple/Foliar (A15929B- 100 OD)	446-452	3	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Apple/Foliar (A15929B- 100 OD)	446-452	3	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Apple/Foliar (A15929B- 100 OD)	446-452	3	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Apple/Foliar (A15929B- 100 OD)	446-452	3	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Apple/Foliar (A16971B- 40 WG)	446-454	3	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

III. CONCLUSION

Application of a DuPont® oil dispersion (OD) formulation and from a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications at an average rate of 150 g ai/ha per application with a 7 day retreatment interval (RTI) and a pre-harvest interval (PHI) of 3 days resulted in average residues of cyantraniliprole in or on apples at 0.29±0.09 ppm, and 0.32±0.04 ppm, respectively. Residues of the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) were each less than LOQ (0.01 ppm) regardless of the formulation applied.

IIIA 7.6.1.7: USA Leaf Lettuce Formulation Bridging Trials

Report	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Leaf Lettuce from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations
Author	Johanna Mazlo
Report No.	T000812-09
Document No.	PMRA No. 2071476. MRID 48432515
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials in/on leaf lettuce during the 2009 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 146-155 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 136-292 L/ha for a maximum seasonal rate of 448-464 g ai/ha/season. Samples were collected at the normal commercial harvest date of 1 day. A non-ionic surfactant was added to the spray mixture according to the label recommendation of the adjuvant. The number of trials and the geographical locations are given in 8. The study use pattern is given in Table 9.

Table 8: Trial Locations for Leaf Lettuce.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
Syngenta T000812-09, W32-9631	10	Porterville, California/USA/2009	Bridging MOR	field
Syngenta T000812-09, W28-9632	10	Fresno, California/USA/2009	Bridging MOR	field
Syngenta T000812-09, W23-9633	10	Corning, California/USA/2009	Bridging MOR	field

Table 9: Study Use Pattern for Leaf Lettuce.

Test ID (City, State/Region, Country, /Year)	EP[a]	Application						Tank Mix Adjuvants
		Method/Timing[b]	Vol (L/ha)	g ai/ha	g ai/hL	RTI[c] (days)	Total Rate (g ai/ha)	
W32-9631 (Porterville, CA, Region 10 USA, 2009)	A15929B	Foliar broadcast/ BBCH 47	290	152	52	5	453	Pro 90 0.5% v/v
		Foliar broadcast/ BBCH 48	290	152	52	5		
		Foliar broadcast/ BBCH 49	286	149	53	--		
	A16971B	Foliar broadcast/ BBCH 47	289	150	52	5	452	Pro 90 0.5% v/v
		Foliar broadcast/ BBCH 48	292	151	51	5		
		Foliar broadcast/ BBCH 49	291	151	52	--		
	A15929B	Foliar broadcast/ BBCH 47	287	150	52	5	452	Pro 90 0.5% v/v
		Foliar broadcast/ BBCH 48	291	152	52	5		
		Foliar broadcast/ BBCH 49	286	151	52	--		
	A16971B	Foliar broadcast/ BBCH 47	292	151	51	5	448	Pro 90 0.5% v/v
		Foliar broadcast/ BBCH 48	287	149	52	5		
		Foliar broadcast/ BBCH 49	286	148	52	--		
	A15929B	Foliar broadcast/ BBCH 47	290	152	52	5	454	Pro 90 0.5% v/v
		Foliar broadcast/ BBCH 48	287	150	52	5		
		Foliar broadcast/ BBCH 49	290	152	52	--		
	A16971B	Foliar broadcast/ BBCH 47	289	150	52	5	450	Pro 90 0.5% v/v
		Foliar broadcast/ BBCH 48	289	150	52	5		
		Foliar broadcast/ BBCH 49	289	150	52	--		

Table 9: Study Use Pattern for Leaf Lettuce.

Test ID (City, State/Region, Country, /Year)	EP[a]	Application						Tank Mix Adjuvants
		Method/Timing[b]	Vol (L/ha)	g ai/ha	g ai/hL	RTI[c] (days)	Total Rate (g ai/ha)	
W28-9632 (Fresno, CA, Region 10 USA, 2009)	A15929B	Foliar broadcast/ 34 leaves	141	151	106	5	448	Induce 0.5% v/v
		Foliar broadcast/ 28 leaves	141	151	107	5		
		Foliar broadcast/ 38 leaves	136	146	110	--		
	A16971B	Foliar broadcast/ 34 leaves	141	151	106	5	453	Induce 0.5% v/v
		Foliar broadcast/ 28 leaves	141	151	107	5		
		Foliar broadcast/ 38 leaves	141	151	106	--		
	A15929B	Foliar broadcast/ 34 leaves	141	151	106	5	449	Induce 0.5% v/v
		Foliar broadcast/ 28 leaves	140	150	107	5		
		Foliar broadcast/ 38 leaves	139	148	108	--		
	A16971B	Foliar broadcast/ 34 leaves	141	151	107	5	453	Induce 0.5% v/v
		Foliar broadcast/ 28 leaves	141	151	107	5		
		Foliar broadcast/ 38 leaves	141	151	106	--		
	A15929B	Foliar broadcast/ 34 leaves	142	152	106	5	451	Induce 0.5% v/v
		Foliar broadcast/ 28 leaves	140	150	107	5		
		Foliar broadcast/ 38 leaves	139	149	108	--		
	A16971B	Foliar broadcast/ 34 leaves	141	151	107	5	452	Induce 0.5% v/v
		Foliar broadcast/ 28 leaves	141	151	106	5		
		Foliar broadcast/ 38 leaves	142	150	106	--		

Table 9: Study Use Pattern for Leaf Lettuce.

Test ID (City, State/ Region, Country, Year)	EP[a]	Application						Tank Mix Adjuvants
		Method/Timing[b]	Vol (L/ha)	g ai/ha	g ai/hL	RTI[c] (days)	Total Rate (g ai/ha)	
W23-9633 (Corning, CA, Region 10 USA, 2009)	A15929B	Foliar broadcast/ 11 DBH	185	155	81	5	463	R-11 0.0125%v/v
		Foliar broadcast/ 6 DBH	185	155	81	5		
		Foliar broadcast/ 1 DBH	183	153	82	--		
	A16971B	Foliar broadcast/ 11 DBH	185	149	81	5	447	R-11 0.0125%v/v
		Foliar broadcast/ 6 DBH	184	149	81	5		
		Foliar broadcast/ 1 DBH	184	149	82	--		
	A15929B	Foliar broadcast/ 11 DBH	185	155	81	5	464	R-11 0.0125%v/v
		Foliar broadcast/ 6 DBH	185	155	81	5		
		Foliar broadcast/ 1 DBH	184	154	82	--		
	A16971B	Foliar broadcast/ 11 DBH	186	150	81	5	451	R-11 0.0125%v/v
		Foliar broadcast/ 6 DBH	185	150	81	5		
		Foliar broadcast/ 1 DBH	185	151	81	--		
	A15929B	Foliar broadcast/ 11 DBH	185	155	81	5	463	R-11 0.0125%v/v
		Foliar broadcast/ 6 DBH	184	154	81	5		
		Foliar broadcast/ 1 DBH	184	154	82	--		
	A16971B	Foliar broadcast/ 11 DBH	186	150	81	5	449	R-11 0.0125%v/v
		Foliar broadcast/ 6 DBH	185	150	81	5		
		Foliar broadcast/ 1 DBH	183	149	82	--		

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.
[b] DBH = Days before harvest
[c] Retreatment Interval

II. Results and Discussion

The analytical method is described in Table 10. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on leaf lettuce. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 5.0 ppm in/on leaf lettuce were 94 and 93% for cyantraniliprole, respectively; 87-109% and 82-102% for its metabolites, respectively as per Table 11. The chromatograms of control samples of leaf lettuce are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27749) supports the storage durations/conditions of samples in the leaf lettuce side-by-side formulation bridging field trials reported in Table 12. No corrections to residues due to in-storage dissipation are necessary. Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the leaf lettuce side-by-side formulation bridging field trials with cyantraniliprole (100 OD and 40 WG) are reported in Table 13. A summary of residue data with both formulations is presented in Table 14.

The maximum residue values of cyantraniliprole in/on leaf lettuce for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 4.5 ppm, and 4.6 ppm, respectively. Residue values for metabolites IN-N7B69, IN-JCZ38, and IN-K7H19 were less than the LOQ (0.01 ppm) for both the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG). The maximum residue values of IN-MYX98 in/on leaf lettuce for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 0.010 ppm, and 0.011 ppm, respectively. The maximum residue values of IN-MLA84 in/on leaf lettuce for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 0.027 ppm, and 0.025 ppm, respectively. The maximum residue values of IN-J9Z38 in/on leaf lettuce for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 0.022 ppm, and 0.026 ppm, respectively.
Residue decline data were not submitted with the study. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 10: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Leaf lettuce samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Genogrinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One ml of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: Phenomenex Synergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSySystems/MDS Sciex API 5000 mass spectrometer (MS/MS)
LOQ	0.010 mg/kg

Table 11: Summary of Concurrent Recoveries of Cyantraniliprole from Leaf Lettuce.

Matrix	Spiking level in ppm (mg/kg)	Sample size (n)	Recoveries (%)	Mean ± SDEV(CV) (%)
Cyantraniliprole				
Leaf Lettuce	0.01	1	94	NA
	5.0	2	96, 94	95±1.4(1.5)
IN-N7B69				
Leaf Lettuce	0.01	1	95	NA
	5.0	1	98	NA
IN-JCZ38				
Leaf Lettuce	0.01	1	109	NA
	5.0	1	98	NA
IN-MYX98				
Leaf Lettuce	0.01	1	97	NA
	5.0	1	93	NA
IN-MLA84				
Leaf Lettuce	0.01	1	87	NA
	5.0	1	88	NA
IN-J9Z38				
Leaf Lettuce	0.01	1	99	NA
	5.0	1	82	NA
IN-K7H19				
Leaf Lettuce	0.01	1	105	NA
	5.0	1	102	NA

Table 12. Summary of Storage Conditions for Leaf Lettuce.

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)
W32-9631 (CA/2009)	Control	Leaf Lettuce	-10±10	3.3
	Cyantraniliprole 100 OD			3.3
	Cyantraniliprole 40 WG			3.3
W28-9632 (CA/2009)	Control	Leaf Lettuce	-10±10	4.2
	Cyantraniliprole 100 OD			4.2
	Cyantraniliprole 40 WG			4.2
W23-9633 (CA/2009)	Control	Leaf Lettuce	-10±10	3.1
	Cyantraniliprole 100 OD			3.1
	Cyantraniliprole 40 WG			3.1

Table 13: Cyantraniliprole Residue Results for Leaf Lettuce.

Test ID (City, State/Region, Country, Year)	EP[a]	Crop/ Variety	Total Rate (g ai/ha)	DAA /PHI[b] (days)	Residues (ppm)[c]						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
W32-9631 (Porterville, CA, Region 10 USA, 2009)	None	Leaf Lettuce/ Butter Crunch	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		453	1	4.0	<0.01	<0.01	<0.01	0.027	0.022	<0.01
	A16971B		452	1	2.3	<0.01	<0.01	<0.01	0.019	0.015	<0.01
	A15929B		452	1	3.1	<0.01	<0.01	<0.01	0.026	0.018	<0.01
	A16971B		448	1	3.4	<0.01	<0.01	<0.01	0.025	0.026	<0.01
	A15929B		454	1	2.5	<0.01	<0.01	<0.01	0.018	0.018	<0.01
	A16971B		450	1	2.6	<0.01	<0.01	<0.01	0.018	0.020	<0.01
W28-9632 (Fresno, CA, Region 10 USA, 2009)	None	Leaf Lettuce/ Parris Island	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		448	1	1.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		453	1	1.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		449	1	1.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		453	1	1.4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		451	1	1.8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		452	1	1.4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
W23-9633 (Corning, CA, Region 10 USA, 2009)	None	Leaf Lettuce/ Tohema	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		463	1	4.5	<0.01	<0.01	0.010	<0.01	0.012	<0.01
	A16971B		447	1	3.8	<0.01	<0.01	<0.01	<0.01	0.015	<0.01
	A15929B		464	1	4.3	<0.01	<0.01	0.010	<0.01	0.015	<0.01
	A16971B		451	1	3.8	<0.01	<0.01	0.011	<0.01	0.014	<0.01
	A15929B		463	1	4.1	<0.01	<0.01	<0.01	<0.01	0.014	<0.01
	A16971B		449	1	4.6	<0.01	<0.01	0.011	<0.01	0.014	<0.01

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

[b] DAA = Days After Application (indicates nominal number of days between last application and sampling). Application timings and PHI timings may vary. The values presented are nominal timings.

[c] Control specimens were collected and analyzed. No residues above the limit of detection (LOQ) were observed.

Table 14. Summary of Residue Bridging Trial Data in/on Leaf Lettuce.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT*	Median	Mean	Std. Dev.
Cyantraniliprole									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	1.1	4.5	4.3	3.1	3.0	1.3
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	1.2	4.6	4.1	2.6	2.7	1.2
IN-J9Z38									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	0.022	0.019	0.010	0.013	0.005
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	0.026	0.020	0.010	0.013	0.006
IN-JCZ38									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	0.027	0.024	0.010	0.015	0.007
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	0.025	0.021	0.010	0.014	0.006
IN-MYX98									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	0.011	0.011	<0.01	0.01	0.0004
IN-N7B69									
Leaf Lettuce/Foliar (A15929B- 100 OD)	448-464	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Leaf Lettuce/Foliar (A16971B- 40 WG)	448-453	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

III. CONCLUSION

Application of a DuPont® oil dispersion (OD) formulation and from a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications in the range of 448-464 g ai/ha//season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on leaf lettuce at 3.0±1.3 ppm, and 2.7±1.2 ppm, respectively. Residues of the metabolites (IN-N7B69, IN-JCZ38, IN-MYX98, and IN-K7H19) were each at or less than LOQ (0.01 ppm) regardless of the formulation applied. In the case of metabolites IN-MLA84, and IN-J9Z38, residues were on average 0.015 ppm, and 0.013 ppm, respectively for both formulations.

IIIA 7.6.1.8 USA Cantaloupe Formulation Bridging Trials

Report	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Cantaloupe from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations
Author	Johanna Mazlo
Report No.	T000813-09
Document No.	PMRA No. 2071500. MRID 48432516
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. Study Design

Syngenta conducted seven crop field trials in/on cantaloupes during the 2009-2010 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG-A16971B). In the 2009 trials, three plots for each of the OD and WG formulations were setup and one sample per plot was collected for a total of three samples per formulation. In the 2010 trials, each trial consisted of one OD and one WG plot, with three samples collected per plot for a total of three samples per formulation. Three foliar applications were made each at 147-154 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 183-341 L/ha for a maximum seasonal rate of 446-462 g ai/ha/season. Samples were collected at the normal commercial harvest date of 1 day. A non-ionic surfactant was added to the spray mixture according to the label recommendation of the adjuvant. The number of trials and the geographical locations are given in Table 15. The study use pattern is given in Table 16.

Table 15: Trial Locations for Cantaloupes.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
T000813-09, W32-9641	10	Porterville, California, USA, 2009	Bridging MOR	field
T000813-09, W28-9642	10	Fresno, California, USA, 2009	Bridging MOR	field
T000813-09, W23-9643	10	Ord Bend, California, USA, 2009	Bridging MOR	field
T000813-09, W32-9644	10	Porterville, California, USA, 2010	Bridging MOR	field
T000813-09, W28-9645	10	Kerman, California, USA, 2010	Bridging MOR	field
T000813-09, W23-9646	10	Orland, California, USA, 2010	Bridging MOR	field
T000813-09, W33-9647	10	Paso Robles, California, USA, 2010	Bridging MOR	field

Table 16: Study Use Pattern for Cantaloupes.

ID (City, State/Region, Country, /Year)	EP[a]	Application						Tank Mix Adjuvants
		Method/Timing[b]	Vol (L/ha)	Appl. Rate (g ai/ha)	Appl. Rate (g ai/hL)	RTI[c] (days)	Total Rate (g ai/ha)	
W32-9641 (Porterville, CA, Region 10 USA, 2009)	A15929B 100 OD	Foliar broadcast/ BBCH 88	291	152	52	5	454	Pro 90 0.25% v/v
		Foliar broadcast/ BBCH 89	290	152	52	5		
		Foliar broadcast/ BBCH 89	286	150	52	--		
	A16971B 40 WG	Foliar broadcast/ BBCH 88	289	151	52	5	454	Pro 90 0.25% v/v
		Foliar broadcast/ BBCH 89	290	151	52	5		
		Foliar broadcast/ BBCH 89	292	152	51	--		
	A15929B 100 OD	Foliar broadcast/ BBCH 88	294	154	51	5	456	Pro 90 0.25% v/v
		Foliar broadcast/ BBCH 89	289	151	52	5		
		Foliar broadcast/ BBCH 89	289	151	52	--		
	A16971B 40 WG	Foliar broadcast/ BBCH 88	289	151	52	5	455	Pro 90 0.25% v/v
		Foliar broadcast/ BBCH 89	293	153	51	5		
		Foliar broadcast/ BBCH 89	289	151	52	--		
	A15929B 100 OD	Foliar broadcast/ BBCH 88	289	151	52	5	453	Pro 90 0.25% v/v
		Foliar broadcast/ BBCH 89	290	152	52	5		
		Foliar broadcast/ BBCH 89	287	150	52	--		
	A16971B 40 WG	Foliar broadcast/ BBCH 88	289	151	52	5	456	Pro 90 0.25% v/v
		Foliar broadcast/ BBCH 89	293	153	51	5		
		Foliar broadcast/ BBCH 89	291	152	52	--		
W28-9642 (Fresno, CA, Region 10 USA, 2009)	A15929B 100 OD	Foliar broadcast/ Fruit to 15 cm	186	149	81	5	449	Induce 0.5% v/v
		Foliar broadcast/ Melons to 13 cm	185	149	81	5		
		Foliar broadcast/ Mature melons	189	151	79	--		
	A16971B 40 WG	Foliar broadcast/ Fruit to 15 cm	188	151	80	5	451	Induce 0.5% v/v
		Foliar broadcast/ Melons to 13 cm	185	148	81	5		
		Foliar broadcast/ Mature melons	190	152	79	--		

Table 16: Study Use Pattern for Cantaloupes.

W28-9642 (Fresno, CA, Region 10 USA, 2009)	A15929B 100 OD	Foliar broadcast/ Fruit to 15 cm	185	149	81	5	449	Induce 0.5% v/v
		Foliar broadcast/ Melons to 13 cm	184	148	81	5		
		Foliar broadcast/ Mature melons	190	152	79	--		
	A16971B 40 WG	Foliar broadcast/ Fruit to 15 cm	188	151	80	5	451	Induce 0.5% v/v
		Foliar broadcast/ Melons to 13 cm	186	149	81	5		
		Foliar broadcast/ Mature melons	189	151	80	--		
	A15929B 100 OD	Foliar broadcast/ Fruit to 15 cm	188	151	80	5	453	Induce 0.5% v/v
		Foliar broadcast/ Melons to 13 cm	187	150	80	5		
		Foliar broadcast/ Mature melons	189	152	79	--		
	A16971B 40 WG	Foliar broadcast/ Fruit to 15 cm	188	151	80	5	453	Induce 0.5% v/v
		Foliar broadcast/ Melons to 13 cm	186	150	81	5		
		Foliar broadcast/ Mature melons	189	152	79	--		
W23-9643 (Ord Bend, CA, Region 10 USA, 2009)	A15929B 100 OD	Foliar broadcast/ 50% fruit size	185	149	81	5	449	R-11 0.0125%v/v
		Foliar broadcast/ 60% fruit size	187	151	80	5		
		Foliar broadcast/ 1 day PHI	186	149	81	--		
	A16971B 40 WG	Foliar broadcast/ 50% fruit size	185	150	81	5	450	R-11 0.0125%v/v
		Foliar broadcast/ 60% fruit size	185	150	81	5		
		Foliar broadcast/ 1 day PHI	185	150	81	--		
	A15929B 100 OD	Foliar broadcast/ 50% fruit size	185	149	81	5	446	R-11 0.0125%v/v
		Foliar broadcast/ 60% fruit size	184	148	82	5		
		Foliar broadcast/ 1 day PHI	185	149	81	--		
	A16971B 40 WG	Foliar broadcast/ 50% fruit size	184	149	82	5	448	R-11 0.0125%v/v
		Foliar broadcast/ 60% fruit size	184	149	82	5		
		Foliar broadcast/ 1 day PHI	185	150	81	--		
W23-9643 (Ord Bend, CA, Region 10 USA, 2009)	A15929B 100 OD	Foliar broadcast/ 50% fruit size	185	149	81	5	447	R-11 0.0125%v/v
		Foliar broadcast/ 60% fruit size	185	149	81	5		
		Foliar broadcast/ 1-day PHI	185	149	81	--		
	A16971B 40 WG	Foliar broadcast/ 50% fruit size	185	150	81	5	448	R-11 0.0125%v/v
		Foliar broadcast/ 60% fruit size	183	148	82	5		
		Foliar broadcast/ 1-day PHI	185	150	81	--		

Table 16: Study Use Pattern for Cantaloupes.

W32-9644 (Porterville, CA, Region 10 USA, 2010)	A15929B 100 OD	Foliar broadcast/ BBCH 85	330	150	45	5	450	Pro 90 0.25% v/v
		Foliar broadcast/ BBCH 87	341	150	44	5		
		Foliar broadcast/ BBCH 85-89	338	150	44	--		
	A16971B 40 WG	Foliar broadcast/ BBCH 85	329	150	46	5	450	Pro 90 0.25% v/v
		Foliar broadcast/ BBCH 87	339	150	44	5		
		Foliar broadcast/ BBCH 85-89	334	150	45	--		
W28-9645 (Kerman, CA, Region 10 USA, 2010)	A15929B 100 OD	Foliar broadcast/ BBCH 86	187	150	80	5	450	Induce 0.5% v/v
		Foliar broadcast/ BBCH 86	187	150	80	5		
		Foliar broadcast/ BBCH 86	186	150	81	--		
	A16971B 40 WG	Foliar broadcast/ BBCH 86	187	150	80	5	446	Induce 0.5% v/v
		Foliar broadcast/ BBCH 86	183	147	82	5		
		Foliar broadcast/ BBCH 86	186	149	81	--		
W23-9646 (Orland, CA Region 10 USA, 2010)	A15929B 100 OD	Foliar broadcast/ 11-day PHI	187	154	80	5	462	R-11 0.03%v/v
		Foliar broadcast/ 6-day PHI	187	154	80	5		
		Foliar broadcast/ 1-day PHI	187	154	80	--		
	A16971B 40 WG	Foliar broadcast/ 11-day PHI	187	150	80	5	450	R-11 0.03%v/v
		Foliar broadcast/ 6-day PHI	187	150	80	5		
		Foliar broadcast/ 1-day PHI	187	150	80	--		
W23-9647 (Paso Robles, CA Region 10 USA, 2010)	A15929B 100 OD	Foliar broadcast/ BBCH 81	328	151	46	5	453	First Choice Speader Sticker 0.06% v/v
		Foliar broadcast/ BBCH 87	323	148	47	5		
		Foliar broadcast/ BBCH 88	335	154	45	--		
	A16971B 40 WG	Foliar broadcast/ BBCH 81	331	151	45	5	451	First Choice Speader Sticker 0.06% v/v
		Foliar broadcast/ BBCH 87	326	148	46	5		
		Foliar broadcast/ BBCH 88	334	152	45	--		

[a]EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

[b]DAA = Days After Application (indicates nominal number of days between last application and sampling). Application timings and PHI timings may vary. The values presented are nominal timings.

[c]Control specimens were collected and analyzed. No residues above the limit of detection (LOQ) were observed.

II. Results and Discussion

The analytical method is briefly described in Table 17. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on cantaloupe. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on cantaloupes were 91-109% and 91-103% for cyantraniliprole, respectively; 88-114% and 82-116% for its metabolites, respectively as per Table 18. The chromatograms of control samples of cantaloupe are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27749) supports the storage durations/conditions of samples in the cantaloupe side-by-side formulation bridging field trials reported in Table 19. No corrections to residues due to in-storage dissipation are necessary. Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the cantaloupe side-by-side formulation bridging field trials with cyantraniliprole (100 OD and 40 WG) are reported in Table 20. A summary of residue data with both formulations is presented in Table 21.

The maximum residue values of cyantraniliprole in/on cantaloupe for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 4.5 ppm, and 4.6 ppm, respectively. Residue values for metabolites IN-N7B69, IN-JCZ38, IN-MLA84, and IN-K7H19 were less than the LOQ (0.01 ppm) for both the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG). The maximum residue values of IN-MYX98 in/on cantaloupes for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 0.011 ppm. The maximum residue values of IN-J9Z38 in/on cantaloupes for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) was 0.015 ppm.
Residue decline data were not submitted with the study. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 17: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Cantaloupe samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Genogrinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One ml of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: Phenomenex Synergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSySystems/MDS Sciex API 5000 mass spectrometer (MS/MS)
LOQ	0.010 mg/kg

Table 18: Summary of Concurrent Recoveries of Cyantraniliprole for Cantaloupes.

Matrix	Spiking level in ppm (mg/kg)	Sample size (n)	Recoveries (%)	Mean ± SDEV(CV) (%)
Cyantraniliprole				
Cantaloupe	0.01	6	99, 107, 94, 95, 91, 109	99 ± 7.3
	1.0	6	97, 96, 94, 91, 101, 103	97 ± 4.4
IN-N7B69				
Cantaloupe	0.01	3	110, 109, 99	106 ± 6.1
	1.0	3	94, 98, 113	102 ± 10
IN-JCZ38				
Cantaloupe	0.01	3	94, 104, 107	102 ± 6.8
	1.0	3	94, 104, 107	102 ± 11
IN-MYX98				
Cantaloupe	0.01	3	96, 99, 106	100 ± 5.1
	1.0	3	97, 112, 107	105 ± 7.6
IN-MLA84				
Cantaloupe	0.01	3	90, 111, 112	104 ± 12
	1.0	3	89, 82, 95	89 ± 6.5
IN-J9Z38				
Cantaloupe	0.01	3	90, 114, 100	101 ± 12
	1.0	3	88, 88, 95	90 ± 4.0
IN-K7H19				
Cantaloupe	0.01	3	88, 91, 96	92 ± 4.0
	1.0	3	101, 116, 97	105 ± 10

Table 19: Summary of Storage Conditions for Cantaloupes.

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)
W32-9641	Control	Cantaloupe	-10	4.8
	Cyantraniliprole 100 OD			4.8
	Cyantraniliprole 40 WG			4.8
W32-9642	Control	Cantaloupe	-10	5.8
	Cyantraniliprole 100 OD			5.8
	Cyantraniliprole 40 WG			5.8
W32-9643	Control	Cantaloupe	-10	10.8
	Cyantraniliprole 100 OD			10.8
	Cyantraniliprole 40 WG			10.8
W32-9644	Control	Cantaloupe	-10	1.6
	Cyantraniliprole 100 OD			1.6
	Cyantraniliprole 40 WG			1.6
W32-9645	Control	Cantaloupe	-10	2.1
	Cyantraniliprole 100 OD			2.1
	Cyantraniliprole 40 WG			2.1
W32-9646	Control	Cantaloupe	-10	2.1
	Cyantraniliprole 100 OD			2.1
	Cyantraniliprole 40 WG			2.1
W32-9647	Control	Cantaloupe	-10	1.0
	Cyantraniliprole 100 OD			0.5
	Cyantraniliprole 40 WG			0.5

Table 20: Cyantraniliprole Residue Results in/on Cantaloupes.

Test ID (City, State/Region, Country, Year)[a]	EP[b]	Crop/ Variety	Total Rate (g ai/ha)	DAA /PHI[c] (days)	Residues (ppm)						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
W32-9641 (Porterville, CA, Region 10 USA, 2009)	None	Cantaloupe/ Top Mark	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		454	1	0.30	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		454	1	0.23	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		456	1	0.31	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		455	1	0.21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		453	1	0.23	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		456	1	0.28	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
W28-9642 (Fresno, CA, Region 10 USA, 2009)	None	Cantaloupe/ Hales Best	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		449	1	0.064	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		451	1	0.064	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		449	1	0.058	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		451	1	0.065	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		453	1	0.067	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		453	1	0.070	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
W23-9643 (Ord Bend, CA, Region 10 USA, 2009)	None	Cantaloupe/ Muskmelon	NA	NA	<0.01 <0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		449	1	0.013 0.015 0.013 0.014 (0.014)	<0.01	<0.01	0.010	<0.01	0.012	<0.01
	A16971B		450	1	0.063 0.073 0.073 0.064 (0.068)	<0.01	<0.01	<0.01	<0.01	0.015	<0.01
	A15929B		446	1	0.023 0.021 (0.022)	<0.01	<0.01	0.010	<0.01	0.015	<0.01
	A16971B		448	1	0.023 0.021 (0.022)	<0.01	<0.01	0.011	<0.01	0.014	<0.01
	A15929B		447	1	0.029 0.028 (0.028)	<0.01	<0.01	<0.01	<0.01	0.014	<0.01
	A16971B		448	1	0.23 0.24 0.36 0.24 (0. 27)	<0.01	<0.01	0.011	<0.01	0.014	<0.01

Table 20: Cyantraniliprole Residue Results in/on Cantaloupes.

W32-9644 (Porterville, CA Region 10 USA, 2010	None	Cantaloupe/ Hale's Best Jumbo	NA	NA	<0.01 <0.01	<0.01	<0.01	0.011	<0.01	0.014	<0.01
	A15929B		450	1	0.13, 0.13 (0.13)	<0.01	<0.01	<0.01	<0.01	0.014	<0.01
					0.12, 0.12 (0.12)	<0.01	<0.01	0.011	<0.01	0.014	<0.01
					0.061 0.056 (0.058)	<0.01	<0.01	0.011	<0.01	0.014	<0.01
				average	0.10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.12 0.13 (0.12)	<0.01	<0.01	<0.01	<0.01	0.014	<0.01
				1	0.091 0.078 (0.084)	<0.01	<0.01	0.011	<0.01	0.014	<0.01
				1	0.10, 0.10 (0.10)	<0.01	<0.01	0.011	<0.01	0.014	<0.01
				average	0.10	<0.01	<0.01	0.01	<0.01	0.014	<0.01
W28-9645 (Kerman, CA, Region 10 USA, 2010)	None	Cantaloupe/ Hales Best	NA	NA	<0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.099 0.097 (0.098)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				1	0.074 0.068 (0.071)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				1	0.056 0.073 (0.064)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.078	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		446	1	0.12, 0.11 (0.12)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				1	0.14, 0.20 (0.17)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				1	0.11 0.090 (0.10)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.13	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01
W23-9646 (Orland, CA Region 10 USA, 2010)	None	Cantaloupe/ Muskmelon	NA	NA	<0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		462	1	0.14, 0.15 (0.14)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				1	0.11, 0.12 (0.12)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				1	0.35, 0.27 (0.31)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.19	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.28, 0.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

					(0.28)						
				1	0.22, 0.17 (0.20)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				1	0.19, 0.21 (0.20)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.23	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
W33-9647 (Paso Robles, CA Region 10 USA, 2010)	None	Cantaloupe/ Top Mark	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		453	1	0.30	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				1	0.31	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				1	0.19	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.27	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01
	A16971B		451	1	0.22	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				1	0.39	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				1	0.46	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				average	0.36	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

[a] In the 2009 trials, each trial contained three plots for each formulation resulting in one sample from each plot. In the 2010 trials, each trial contained one plot for each formulation resulting in three samples from each plot.

[b] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

[c] DAA = Days After Application (indicates nominal number of days between last application and sampling). Application timings and PHI timings may vary. The values presented are nominal timings.

Table 21. Summary of Residue Bridging Trial Data in/on Cantaloupes.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n[1]	Min.	Max.	HAFT*	Median	Mean	Std. Dev.
Cyantraniliprole									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	0.014	0.35	0.31	0.078	0.13	0.11
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	0.021	0.46	0.36	0.13	0.16	0.11
IN-J9Z38									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	0.015	0.014	<0.01	0.011	0.001
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	0.015	0.014	<0.01	0.011	0.002
IN-JCZ38									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	0.011	.011	<0.01	0.010	0.0003
IN-N7B69									
Cantaloupe/Foliar (A15929B- 100 OD)	446-462	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cantaloupe/Foliar (A16971B- 40 WG)	446-456	1	13	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] n = number of plots. Each plot was considered independent. Results for each plot (replicate samples and/or replicate analyses) were averages.

III. CONCLUSION

Application of a DuPont® oil dispersion (OD) formulation and from a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications in the range of 446-462 g ai/ha//season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on cantaloupe at 0.13±0.11 ppm, and 0.16±0.11 ppm, respectively. Residues of the metabolites (IN-N7B69, IN-MLA84, IN-JCZ38, and IN-K7H19) were each at or less than LOQ (0.01 ppm) regardless of the formulation applied. In the case of metabolite IN-J9Z38, residues were on average 0.011±0.001 ppm, and 0.011±0.002 ppm, respectively for both formulations. For metabolite, IN-MYX98, residues were less than 0.01 ppm for the A15929B-100OD formulation, and 0.01±0.0003 ppm for the A16971B-40WG formulation.

IIIA 7.6.1.9 Application method comparative residue data

Cyantraniliprole Soil and Foliar Application Methods Residues

A side-by-side application method comparison study utilizing the Syngenta WG formulation was performed to determine the contributions of soil and foliar applications to the magnitude of the residue. The study was performed on five crops to cover the various crop groups (i.e. spinach for leafy vegetable group, cabbage and mustard greens for the brassica vegetable group, hot pepper for the fruiting vegetable group, and cucumbers for the cucurbit vegetable group).

The study design involved three treatments. The first treatment was a solo soil application (drench and/or shank depending on the crop) at an application rate of 200 g ai/ha with a 30 day PHI. The second treatment involved both soil and foliar applications. A single soil application at a rate of 200 g ai/ha with a 30 day PHI was followed by a foliar application of 100 g ai/ha with a 6 day PHI and another foliar application at a rate of 150 g ai/ha with a 1 day PHI. The third treatment involved three foliar applications at a rate of 150 g ai/ha per application with an 11, 6, and 1 day PHI.

The soil application of the WG cyantraniliprole formulation resulted in residues below 0.01 ppm which is the limit of quantitation (LOQ). Based on the data, the highest residues were observed in treatment three, the three foliar applications at a rate of 150 g ai/ha per application. A comparison of the cyantraniliprole residues is presented below.

Table 22: Comparison of Soil and Foliar Application Residue Data.

Commodity	Average Residue Rates (ppm)*		
	Soil	Soil + 2 Foliar	3 Foliar

	(200 g ai/ha)	(200 + 100 + 150 g ai/ha)	(3 x 150 g ai/ha)
Hot pepper	<LOQ (0.01 ppm)	0.19	0.35
Cabbage	<LOQ (0.01 ppm)	0.52	0.62
Mustard greens	<LOQ (0.01 ppm)	6.3	8.7
Spinach	<LOQ (0.01 ppm)	5.5	6.8
Cucumber	<LOQ (0.01 ppm)	0.07	0.08

IIIA 7.6.1.9 USA Cabbage and Mustard Greens with Cyantraniliprole WG Formulation Residue Bridging Study for Different Application Methods.

Report	Cyantraniliprole (A16971B) – Magnitude of the Residues in or on Cabbage and Mustard Greens from Side-by-Side Bridging Trials to Comparing Soil and Foliar Applications.
Author	Johanna Mazlo
Report No.	T001426-09
Document No.	PMRA No. 2071516. MRID 48432517
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials each in/on cabbage and mustard greens during the 2009 and 2010 growing seasons in the United States with a side-by-side comparison of soil applications (drench or shank), and foliar applications using Syngenta water dispersible granules (40 WG- A16971B). The first treatment was a solo soil application (drench or shank) at an application rate of 200 g ai/ha with a 30 day PHI and a spray volume of 94-1122 L/ha. The second treatment involved both soil and foliar applications. A single soil application at a rate of 200 g ai/ha with a spray volume of 94-1122 L/ha and a retreatment interval of 24 days was followed by a foliar application of 100 g ai/ha with a spray volume of 47-374 L/ha at a retreatment interval of 5 days and another foliar application at a rate of 150 g ai/ha with a spray volume of 47-374 L/ha. Samples were collected at the normal commercial harvest date of 1 day. The third treatment involved three foliar applications at a rate of 150 g ai/ha per application at a retreatment interval of 5 days with a spray volume of 47 to 374 L/ha. Samples were collected at the normal harvest date of 1 day. A non-ionic surfactant was added to the spray mixture according to the label recommendation of the adjuvant. The number of trials and the geographical locations are given in Table 23. The study use pattern is given in Table 24.

Table 23: Trial Locations for Cabbage and Mustard Greens

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
E03-9701	1	North Rose, NY/USA/2009	Bridging MOR	Field
E12-9702	2	Athens, GA/USA/2009	Bridging MOR	Field
C18-9704	5	Richland, IA/USA/2009	Bridging MOR	Field
W28-9705	10	Fresno, CA/USA/2009	Bridging MOR	Field
W28-9706	10	Fresno, CA/USA/2009	Bridging MOR	Field
C18-9707	5	Richland, IA/USA/2010	Bridging MOR	Field

Table 24: Study Use Pattern for Cabbage and Mustard Greens.

Test ID(City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	Application Rate (g ai/ha)	RTI[b] (days)	Total Rate (g ai/ha)	
E03-9701 (North Rose, NY, Region 1 USA, 2009)	A16971B (40 WG)	Soil drench/ 10-15 cm vegetative heads	1031	200	--	200	None
	A16971B (40 WG)	Soil drench/ 10-15 cm vegetative heads	1029	199	24	449	Induce 0.25% v/v
		Foliar broadcast/ 13-18 cm heads	329	101	5		
		Foliar broadcast/ 13-18 cm heads	325	149	--		
	A16971B (40 WG)	Foliar broadcast/ 13-18 cm heads	327	149	5	449	Induce 0.25% v/v
		Foliar broadcast/ 13-18 cm heads	325	149	5		
		Foliar broadcast/ 13-18 cm heads	330	151	--		
E12-9702 (Athens, GA, Region 2 USA, 2009)	A16971B (40 WG)	Soil drench/BBCH 12	144	200	--	200	None
	A16971B (40 WG)	Soil drench/BBCH 12	144	199	24	444	Induce 0.125% v/v
		Foliar broadcast/BBCH 47	227	97	5		
		Foliar broadcast/BBCH 48-49	216	148	--		
	A16971B (40 WG)	Foliar broadcast/BBCH 45-46	228	154	5	452	Induce 0.125% v/v
		Foliar broadcast/BBCH 47	228	149	5		
		Foliar broadcast/BBCH 48-49	217	149	--		
C18-9704 (Richland, IA, Region 5 USA, 2009)	A16971B (40 WG)	Soil drench/BBCH 11	861	199	--	199	None
	A16971B (40 WG)	Soil drench/BBCH 11	861	199	24	449	X-77 0.24-0.3%v/v
		Foliar broadcast/BBCH 18	169	102	5		
		Foliar broadcast/BBCH 20	166	149	--		
	A16971B (40 WG)	Foliar broadcast/BBCH 16	144	148	5	445	X-77 0.24-0.3%v/v
		Foliar broadcast/BBCH 18	163	147	5		
		Foliar broadcast/BBCH 20	167	150	--		

Table 24: Study Use Pattern for Cabbage and Mustard Greens.

W28-9705 (Fresno, CA, Region 10 USA, 2009)	A16971B (40 WG)	Soil shank/ Heads forming	839	198	--	198	None
	A16971B (40 WG)	Soil shank/Heads forming	841	199	24	448	Induce 0.5%v/v
		Foliar broadcast/Heads covered	186	99	5		
		Foliar broadcast/Heads formed	188	151	--		
	A16971B (40 WG)	Foliar broadcast/Heads formed	186	150	5	449	Induce 0.5%v/v
		Foliar broadcast/Heads covered	185	149	5		
		Foliar broadcast/Heads formed	188	151	--		
W28-9706 (Fresno, CA, Region 10 USA, 2009)	A16971B (40 WG)	Soil shank/30 leaves	841	199	--	199	None
	A16971B (40 WG)	Soil shank/30 leaves	842	199	24	447	Induce 0.5%v/v
		Foliar broadcast/36 leaves	186	99	5		
		Foliar broadcast/30 leaves	186	149	--		
	A16971B (40 WG)	Foliar broadcast/32 leaves	184	147	5	445	Induce 0.5%v/v
		Foliar broadcast/36 leaves	187	150	5		
		Foliar broadcast/30 leaves	184	147	--		
C18-9707 (Richland, IA, Region 5 USA, 2010)	A16971B (40 WG)	Soil drench/BBCH 42	685	198	--	198	None
	A16971B (40 WG)	Soil drench/BBCH 42	685	198	24	444	Preference 0.25%v/v
		Foliar broadcast/BBCH 47	177	98	5		
		Foliar broadcast/BBCH 49	173	149	--		
	A16971B (40 WG)	Foliar broadcast/BBCH 46	175	148	5	447	Preference 0.25%v/v
		Foliar broadcast/BBCH 47	179	148	5		
		Foliar broadcast/BBCH 49	175	150	--		

[a] EP = End-use Product; A15929B is an oil dispersion concentrate; A16971B is a wettable granular concentrate; [b]Retreatment Interval

II. FINDINGS

The analytical method is briefly described in Table 25. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on cabbage and mustard greens. The procedural recoveries reported from spiking cabbage at levels of 0.01 ppm (i.e. method LOQ), 1.0 ppm, and 2.0 ppm were between 78 and 112% for cyantraniliprole and its metabolites as per Table 26. The procedural recoveries reported from spiking mustard greens at levels of 0.01 ppm (i.e. method LOQ), 10 ppm, and 12.0 ppm were between 81 and 100% for cyantraniliprole and its metabolites. The chromatograms of control samples of cabbage and mustard greens are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27747) supports the storage durations/conditions of samples in the cabbage and mustard greens side-by-side formulation bridging field trials reported in Table 27. No corrections to residues due to in-storage dissipation are necessary.
Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the cabbage and mustard greens side-by-side formulation bridging field trials with cyantraniliprole 40 WG using soil and foliar applications are reported in Table 28. A summary of residue data with the different application methods is presented in Table 29. The maximum residue values of cyantraniliprole in/on cabbage using the Syngenta water dispersible granule formulation (40 WG) were <0.01 ppm, 1.3 ppm, and 1.5 ppm following 1 soil application, 1 soil application + 2 foliar applications, and 3 foliar applications, respectively. Residue values for all metabolites were less than the LOQ (0.01 ppm) in/on cabbage when treated as 1 soil application, 1 soil application + 2 foliar applications, and 3 foliar applications.

The maximum residue values of cyantraniliprole in/on mustard greens using the Syngenta water dispersible granule formulation (40 WG) were 0.017 ppm, 8.9 ppm, and 11 ppm following 1 soil application, 1 soil application + 2 foliar applications, and 3 foliar applications, respectively. Residue values for metabolites IN-N7B69, IN-JCZ38, and IN-K7H19 were less than the LOQ (0.01 ppm) in/on mustard greens when treated as 1 soil application, 1 soil application + 2 foliar applications, and 2 foliar applications. Residue values for all metabolites were less than the LOQ (0.01 ppm) in/on mustard greens when treated as 1 soil application. The maximum residue values for metabolites IN-MYX98, IN-J9Z8 were 0.013 ppm, 0.014 ppm, respectively when treated with 1 soil application followed by 2 foliar applications. The maximum residue values for metabolites IN-MYX98, IN-J9Z8, and IN-MLA84 were 0.019 ppm, 0.024 ppm, and 0.015 ppm, respectively when treated with 3 foliar applications.

The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 25: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Cabbage and mustard greens samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Geno-Grinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One mL of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: PhenomenexSynergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSystems/MDS Sciex API 5000 mass spectrometer (MS/MS).
MRM Transitions	Cyantraniliprole/DPX-HGW86 (475/286); IN-N7B69 (491/286); IN-JCZ38 (493/462); IN-MYX98 (491/444); IN-MLA84 (443/298); IN-J9Z38 (457/299).
LOQ	0.010 mg/kg

Table 26: Summary of Concurrent Recoveries of Cyantraniliprole from Cabbage and Mustard Greens.

Matrix	Spiking level (ppm)	Sample size(n)	Recoveries(%)	Mean ± SDEV(%)
Cyantraniliprole				
Cabbage	0.01	3	94, 95, 96	95±1
	1.0	2	94, 112	103±13
	2.0	1	95	NA
IN-N7B69				
Cabbage	0.01	2	103, 106	105±2.1
	1.0	1	98	NA
	2.0	1	99	NA
IN-JCZ38				
Cabbage	0.01	2	92, 93	92±0.71
	1.0	1	94	NA
	2.0	1	100	NA
IN-MYX98				
Cabbage	0.01	2	87, 95	91±5.6
	1.0	1	99	NA
	2.0	1	95	NA
IN-MLA84				
Cabbage	0.01	2	89, 89	89
	1.0	1	82	NA
	2.0	1	92	NA
IN-J9Z38				
Cabbage	0.01	2	89, 100	94±7.8
	1.0	1	78	NA
	2.0	1	89	NA
IN-K7H19				

Matrix	Spiking level (ppm)	Sample size(n)	Recoveries(%)	Mean ± SDEV(%)
Cabbage	0.01	2	104, 105	104±0.71
	1.0	1	94	NA
	2.0	1	108	NA

Table 26: Summary of Concurrent Recoveries of Cyantraniliprole from Cabbage and Mustard Greens.

Cyantraniliprole				
Mustard Greens	0.01	1	98	NA
	10	1	98	NA
	12	1	81	NA
IN-N7B69				
Mustard Greens	0.01	1	96	NA
	10	1	97	NA
IN-JCZ38				
Mustard Greens	0.01	1	92	NA
	10	1	100	NA
IN-MYX98				
Mustard Greens	0.01	1	99	NA
	10	1	95	NA
IN-MLA84				
Mustard Greens	0.01	1	87	NA
	10	1	87	NA
IN-J9Z38				
Mustard Greens	0.01	1	100	NA
	10	1	85	NA
IN-K7H19				
Mustard Greens	0.01	1	99	NA
	10	1	98	NA

Table 27: Summary of Storage Conditions for Cabbage and Mustard Greens.

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)
E03-9701 (NY/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Cabbage	<-10 (±5°C)	6.7
E12-9702 (GA/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Mustard Greens	<-10 (±5°C)	4.1
C18-9704 (IA/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Mustard Greens	<-10 (±5°C)	5.8
W28-9705 (CA/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Cabbage	<-10 (±5°C)	3.6
W28-9706 (CA/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Mustard Greens	<-10 (±5°C)	4.8
C18-9707 (IA/2010)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Cabbage	<-10 (±5°C)	0.6 1.7 1.7

Table 28: Cyantraniliprole Residue Results in/on Cabbage and Mustard Greens.

Test ID	EP[a]	Crop/ Variety	Matrix	Total Rate (g ai/ha)	PHI (days)	Residues (ppm)						
						DPX-HGW 86	IN-N7B 69	IN-JCZ 38	IN-MYX 98	IN-MLA 84	IN-J9Z 38	IN-K7H 19
E03-9701 (North Rose, NY, Region 1 USA, 2009)	A16971 B	Cabbage/ Atlantis	Heads with wrapper leaves	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				200	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
				449	1	1.2, 1.3	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
				449	1	1.4, 1.5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
E12-9702 (Athens, GA, Region 2 USA, 2009)	A16971 B	Mustard Greens/ Southern Giant Curled	Leaves	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				200	30	<0.01 0.017	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
				444	1	7.8, 8.9	<0.01 <0.01	<0.01 <0.01	<0.01 0.011	<0.01 <0.01	0.014 0.014	<0.01 <0.01
				452	1	9.4, 9.6	<0.01 <0.01	<0.01 <0.01	0.012 0.013	<0.01 <0.01	0.023 0.024	<0.01 <0.01
C18-9704 (Richland, IA, Region 5 USA, 2009)	A16971 B	Mustard Greens/ Tendergreen	Leaves	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				199	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
				449	1	7.7,7.1	<0.01 <0.01	<0.01 <0.01	0.013 0.013	<0.01 <0.01	<0.01 0.01	<0.01 <0.01
				445	1	10.3, 10.6	<0.01 <0.01	<0.01 <0.01	0.019 0.019	<0.01 <0.01	0.015 0.016	<0.01 <0.01
W28-9705 (Fresno, CA, Region 10 USA, 2009)	A16971 B	Cabbage/ Red Rookie	Heads with wrapper leaves	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				198	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
				448	1	0.085 0.094	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
				449	1	0.17, 0.16	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
W28-9706 (Fresno, CA, Region 10 USA, 2009)	A16971 B	Mustard Greens/ Florida Broadleaf	Leaves	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				199	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
				447	1	3.3, 3.2	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
				445	1	7.1, 5.4	<0.01 <0.01	<0.01 <0.01	0.021 0.018	0.015 0.011	0.018 0.012	<0.01 <0.01

Test ID	EP[a]	Crop/ Variety	Matrix	Total Rate (g ai/ha)	PHI (days)	Residues (ppm)						
						DPX-HGW 86	IN-N7B 69	IN-JCZ 38	IN-MYX 98	IN-MLA 84	IN-J9Z 38	IN-K7H 19
C18-9707 (Richland, IA, Region 5 USA, 2010)	A16971 B	Cabbage/ Golden Acre	Heads with wrapper leaves	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
				198	30	<0.01, <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
				444	1	0.30, 0.33 0.32, 0.15 0.20, 0.19	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
				447	1	0.41, 0.51 0.43, 0.13 0.20, 0.26	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

[a] EP = End-use Product; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

Table 29: Summary of Residue Bridging Trial Data in/on Cabbage and Mustard Greens.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI[a] (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
CABBAGE (A16971B- 40 WG)									
Cyantraniliprole									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	10	0.085	3.0	1.3	0.26	0.69	0.93
3 Foliar	447-449	1	10	0.13	1.5	1.5	0.34	0.52	0.51
IN-N7B69									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-J9Z38									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
1 Soil Application	198-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	447-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

MUSTARD GREENS (A16971B- 40 WG)									
Cyantraniliprole									
1 Soil Application	199-200	30	6	<0.01	0.017	0.014	0.01	0.011	0.003
1 Soil + 2 Foliar	444-449	1	6	3.2	8.9	8.4	7.4	6.3	2.5
3 Foliar	445-452	1	6	5.4	10.6	10.4	9.5	8.7	2.1
IN-N7B69									
1 Soil Application	199-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	445-452	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
1 Soil Application	199-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	445-452	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
1 Soil Application	199-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	445-452	1	6	0.012	0.021	0.020	0.019	0.017	0.004
IN-MLA84									
1 Soil Application	199-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	445-452	1	6	<0.01	0.015	0.013	0.01	0.011	0.002
IN-J9Z38									
1 Soil Application	199-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	0.014	0.014	0.01	0.011	0.002
3 Foliar	445-452	1	6	0.012	0.024	0.024	0.017	0.018	0.005
IN-K7H19									
1 Soil Application	199-200	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	444-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	445-452	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

[a] PHI: Pre-harvest interval
[b] HAFT: Highest Average Field Trial Value

III. CONCLUSION

Application of Syngenta water dispersible granule (WG) formulation was conducted in side-by-side plots to assess the residues of cyantraniliprole and its metabolites in cabbage and mustard greens following a soil application (198-200 g ai/ha; PHI of 30 days), a soil application followed by 2 foliar applications (444-449 g ai/ha; PHI of 1 day), and 3 foliar applications (445-452 g ai/ha; PHI of 1 day).

Residues of each metabolite were <0.01 ppm in cabbage for all application methods. Residues of cyantraniliprole in cabbage were <0.01 ppm (soil application), and 0.69±0.93 ppm (soil + foliar applications), and 0.52±0.51 ppm (foliar applications).
Residues of cyantraniliprole in mustard greens were 0.011±0.003 ppm (soil only), 6.3±2.5 ppm (soil + 2 foliar), and 8.7±2.1 ppm (3 foliar). Only metabolite IN-J9Z38 (0.011±0.002 ppm) had quantifiable residues in mustard greens following one soil and 2 foliar applications of A16971B-40WG formulation. In mustard greens, residues of all metabolites were <0.01 ppm for soil only application. Residues of the metabolites were <0.01 ppm following 3 foliar applications, with the exception of IN-MYX98 (0.017±0.004 ppm), IN-MLA84 (0.011±0.002 ppm), and IN-J9Z38 (0.018±0.005 ppm).

IIIA 7.6.1.10 USA Cucumbers with Cyantraniliprole WG Formulation Residue Bridging Study for Different Application Methods.

Report	Cyantraniliprole (A16971B) – Magnitude of the Residues in or on Cucumbers from Side-by-Side Bridging Trials to Comparing Soil and Foliar Applications.
Author	Johanna Mazlo
Report No.	TK0012472
Document No.	PMRA No. 2071524. MRID 48432520
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials each in/on cucumbers during the 2009 and 2010 growing seasons in the United States with a side-by-side comparison of soil applications (drench), and foliar applications using Syngenta water dispersible granules (40 WG- A16971B). The first treatment was a drench soil application at 199-201 g ai/ha/season with a 30 day PHI and a spray volume of 678-845 L/ha. The second treatment involved a soil (24-day retreatment interval) and 2 foliar applications (5-day retreatment) for a total of 446-449 g ai/ha/season with a spray volume of 153-224 L/ha. Samples were collected at the normal commercial harvest date of 1 day. The third treatment involved three foliar applications (5-day retreatment interval) at a rate of 450-455 g ai/ha/season with a spray volume of 154 to 233 L/ha. Samples were collected at the normal harvest date of 1 day. A non-ionic surfactant was added to the spray mixture according to the label recommendation of the adjuvant. The number of trials and the geographical locations are given in Table 30. The study use pattern is given in Table 31.

Table 30: Trial Locations for Cucumbers.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
E14-9731	2	Chula/GA//USA/2010	Bridging MOR	Field
W28-9733	10	Fresno/CA//USA/2009	Bridging MOR	Field
C18-9734	5	Richland, IA/USA/2010	Bridging MOR	Field

Table 31: Study Use Pattern for Cucumbers.

Test ID(City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	Application Rate (g ai/ha)	RTI[b] (days)	Total Rate (g ai/ha)	
E14-9731 (Chula, GA, Region 2 USA, 2010)	A16971B (40 WG)	Soil drench/BBCH 17	686	201	--	201	None
	A16971B (40 WG)	Soil drench/BBCH 17	683	200	24	449	Induce 0.25% v/v
		Foliar broadcast/BBCH-705	233	100	5		
		Foliar broadcast/BBCH-707	230	150	--		
	A16971B (40 WG)	Foliar broadcast/BBCH 75	224	151	5	451	Induce 0.25% v/v
		Foliar broadcast/BBCH-705	233	150	5		
		Foliar broadcast/BBCH-707	230	150	--		
W28-9733 (Fresno, CA, Region 10, USA, 2009)	A16971B (40 WG)	Soil drench/Fruit to 3 in	845	200	--	200	None
	A16971B (40 WG)	Soil drench/Fruit to 3 in	834	197	24	446	Induce 0.5% v/v
		Foliar broadcast/Fruit to 9 in	186	99	5		
		Foliar broadcast/Fruit to 7	187	150	--		
	A16971B (40 WG)	Foliar broadcast/Fruit to 6 in	187	150	5	450	Induce 0.5% v/v
		Foliar broadcast/Fruit to 9 in	186	150	5		
		Foliar broadcast/Fruit to 7 in	187	150	--		
C18-9734 (Richland, IA, Region 5 USA, 2010)	A16971B (40 WG)	Soil drench/BBCH 51	678	199	--	199	None
	A16971B (40 WG)	Soil drench/ BBCH 51	678	199	24	449	Preference 0.25% v/v
		Foliar broadcast/ BBCH 79	153	99	5		
		Foliar broadcast/ BBCH 89	155	150	--		
	A16971B (40 WG)	Foliar broadcast/ BBCH 79	162	150	5	455	Preference 0.25% v/v
		Foliar broadcast/ BBCH 79	154	152	5		
		Foliar broadcast/ BBCH 89	157	151	--		

[a] EP = End-use Product; A15929B is an oil dispersion concentrate; A16971B is a wettable granular concentrate; [b]Retreatment Interval

II. Results and Discussion

The analytical method is briefly described in Table 32. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on cucumbers. The procedural recoveries reported from spiking cucumbers at levels of 0.01 ppm (i.e. method LOQ), 0.1 ppm, and 1.0 ppm were between 70 and 120% for cyantraniliprole and its metabolites as per Table 33. The chromatograms of control samples of cucumbers are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27747) supports the storage durations/conditions of samples in the cucumber side-by-side formulation bridging field trials reported in Table 34. No corrections to residues due to in-storage dissipation are necessary. Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the cucumber side-by-side formulation bridging field trials with cyantraniliprole 40 WG using soil and foliar applications are reported in Table 35. A summary of residue data with the different application methods is presented in Table 36.

The maximum residue values of cyantraniliprole in/on cucumbers using the Syngenta water dispersible granule formulation (40 WG) were <0.01 ppm, 0.085 ppm, and 0.107 ppm following 1 soil application, 1 soil application + 2 foliar applications, and 3 foliar applications, respectively. Residue values for all metabolites were less than the LOQ (0.01 ppm) in/on cucumbers when treated as 1 soil application, 1 soil application + 2 foliar applications, and 3 foliar applications.

The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 32: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Cucumber samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Geno-Grinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One mL of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: Phenomenex Synergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSystems/MDS Sciex API 5000 mass spectrometer (MS/MS).
MRM Transitions	Cyantraniliprole/DPX-HGW86 (475/286); IN-N7B69 (491/286); IN-JCZ38 (493/462); IN-MYX98 (491/444); IN-MLA84 (443/298); IN-J9Z38 (457/299).
LOQ	0.010 mg/kg

Table 33: Summary of Concurrent Recoveries of Cyantraniliprole from Cucumbers.

Matrix	Spiking level (ppm)	Sample size(n)	Recoveries (%)	Mean ± SDEV (%)
Cyantraniliprole				
Cucumbers	0.01	3	89, 103, 97	96±7.0
	0.10	2	107, 104	106±2.1
	1.0	1	102	NA
IN-N7B69				
Cucumbers	0.01	3	103, 80, 115	99±18
	0.10	2	98, 96	97±1.4
	1.0	1	109	NA
IN-JCZ38				
Cucumbers	0.01	3	94, 106, 101	100±6.0
	0.10	2	106, 110	108±2.8
	1.0	1	101	NA
IN-MYX98				
Cucumbers	0.01	3	94, 100, 95	96±3.2
	0.10	2	104, 101	103±2.1
	1.0	1	104	NA
IN-MLA84				
Cucumbers	0.01	3	91, 94, 91	92±1.7
	0.10	2	98, 80	89±13
	1.0	1	92	NA
IN-J9Z38				
Cucumbers	0.01	3	95, 82, 104	94±11
	0.10	2	98, 82	90±11
	1.0	1	90	NA
IN-K7H19				
Cucumbers	0.01	3	94, 108, 109	104±0.8.4
	0.10	2	104, 117	111±0.9.2
	1.0	1	103	NA

Table 34: Summary of Storage Conditions for Cucumbers.

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)
E14-9731 (GA/2010)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Cucumbers	<-20 (±10°C)	0.6
W28-9733 (CA/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Cucumbers	<-20 (±10°C)	5.3
C18-9734 (IA/2010)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Cucumbers	<-20 (±10°C)	1.1

Table 35: Cyantraniliprole Residue Results in/on Cucumbers.

Test ID	EP[a]	Crop/ Variety	Appl. Type	Total Rate (g ai/ha)	PHI (days)	Residues (ppm)						
						DPX-HGW 86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
E14-9731 (Chula, GA, Region2, USA, 2010)	A16971B	Mature Fruit Cucumber/ *Thunder*	Control	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			1 soil	201	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			1 soil + 2 foliar	449	1	0.085 0.074	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			3 foliar	451	1	0.061 0.067	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
W28-9733 (Fresno,CA, Region 10 USA, 2009)	A16971B	Mature Fruit Cucumber/ *Poinsettia*	Control	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			1 soil	200	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			1 soil + 2 foliar	446	1	0.055 0.049	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			3 foliar	450	1	0.11 0.090	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
C18-9734 (Richland, IA, Region 5 USA, 2010)	A16971B	Mature Fruit Cucumber/*Bush Pickle*	Control	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			1 soil	199	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			1 soil + 2 foliar	449	1	0.071 0.055	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			3 foliar	455	1	0.076 0.059	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

[a] EP = End-use Product; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

Table 36: Summary of Residue Bridging Trial Data in/on Cucumbers.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI[a] (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
CUCUMBERS (A16971B- 40 WG)									
Cyantraniliprole									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	0.049	0.085	0.080	0.063	0.065	0.014
3 Foliar	450-455	1	6	0.060	0.107	0.099	0.071	0.077	0.019
IN-N7B69									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-J9Z38									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
1 Soil Application	199-201	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	446-449	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	450-455	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

[a] PHI: Pre-harvest interval
[b] HAFT: Highest Average Field Trial Value

III. CONCLUSION

Application of Syngenta water dispersible granule (WG) formulation was conducted in side-by-side plots to assess the residues of cyantraniliprole and its metabolites in/on cucumbers following a soil application (199-201 g ai/ha; PHI of 30 days), a soil application followed by 2 foliar applications (446-449 g ai/ha; PHI of 1 day), and 3 foliar applications (450-455 g ai/ha; PHI of 1 day).

Residues of each metabolite were <0.01 ppm in cucumbers for all application methods. Average residues of cyantraniliprole in cucumbers were <0.01 ppm (soil application), and 0.065±0.014 ppm (soil + 2 foliar applications), and 0.077±0.019 ppm (foliar applications).

IIIA 7.6.1.11 USA Cyantraniliprole WG Formulation Residue Bridging Study in/ Spinach for Different Application Methods.

Report	Cyantraniliprole (A16971B) – Magnitude of the Residues in or on Spinach from Side-by-Side Bridging Trials to Comparing Soil and Foliar Applications.
Author	Johanna Mazlo
Report No.	T001428-09
Document No.	PMRA No. 2071521. MRID 48432519
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials each in/on spinach during the 2009 growing seasons in the United States with a side-by-side comparison of soil applications (drench), and foliar applications using Syngenta water dispersible granules (40 WG- A16971B). The first treatment was a drench soil application at 200-203 g ai/ha/season with a 30 day PHI and a spray volume of 282-592 L/ha. The second treatment involved a soil (24-day retreatment interval) and 2 foliar applications (5-day retreatment) for a total of 452-457 g ai/ha/season with a spray volume of 188-589 L/ha. Samples were collected at the normal commercial harvest date of 1 day. The third treatment involved three foliar applications (5-day retreatment interval) at a rate of 448-472 g ai/ha/season with a spray volume of 183 to 287 L/ha. Samples were collected at the normal harvest date of 1 day. A non-ionic surfactant was added to the spray mixture according to the label recommendation of the adjuvant. The number of trials and the geographical locations are given in Table 37. The study use pattern is given in Table 38.

Table 37: Trial Locations for Spinach.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
E14-9721	2	Chula/GA//USA/2009	Bridging MOR	Field
W08-9722	6	Raymondville/TX//USA/2009	Bridging MOR	Field
W29-9723	10	Madera/CA//USA/2009	Bridging MOR	Field

Table 38: Study Use Pattern for Spinach.

Test ID(City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	Application Rate (g ai/ha)	RTI[b] (days)	Total Rate (g ai/ha)	
E14-9721 (Chula, GA, Region 2 USA, 2009)	A16971B (40 WG)	Soil drench/vegetative	592	201	--	201	None
	A16971B (40 WG)	Soil drench/vegetative	589	200	24	452	Induce 0.25% v/v
		Foliar broadcast/vegetative	189	101	5		
		Foliar broadcast/vegetative	191	151	--		
	A16971B (40 WG)	Foliar broadcast/vegetative	186	151	5	448	Induce 0.25% v/v
		Foliar broadcast/vegetative	183	147	5		
		Foliar broadcast/vegetative	189	150	--		
W28-9722 (Raymondville,TX, Region 6, USA, 2009)	A16971B (40 WG)	Soil drench/BBCH 14	572	203	--	203	None
	A16971B (40 WG)	Soil drench/BBCH 14	562	200	24	457	Induce 0.25% v/v
		Foliar broadcast/ BBCH 47	200	106	5		
		Foliar broadcast/ BBCH49	188	151	--		
	A16971B (40 WG)	Foliar broadcast/ BBCH45	194	156	5	473	Induce 0.25% v/v
		Foliar broadcast/ BBCH47	199	160	5		
		Foliar broadcast/ BBCH49	196	157	--		
C18-9723 (Madera, CA, Region 10, USA, 2010)	A16971B (40 WG)	Soil drench/BBCH 19	282	200	--	200	None
	A16971B (40 WG)	Soil drench/ BBCH 19	282	200	24	453	R-11 0.12% v/v
		Foliar broadcast/ BBCH 19	288	102	5		
		Foliar broadcast/ BBCH 19	282	151	--		
	A16971B (40 WG)	Foliar broadcast/ BBCH 19	287	153	5	458	R-11 0.12% v/v
		Foliar broadcast/ BBCH19	287	153	5		
		Foliar broadcast/ BBCH19	283	152	--		

[a] EP = End-use Product; A15929B is an oil dispersion concentrate; A16971B is a wettable granular concentrate; [b]Retreatment Interval

II. Results and Discussion

The analytical method is briefly described in Table 39. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on spinach. The procedural recoveries reported from spiking spinach at levels of 0.01 ppm (i.e. method LOQ), and 10 ppm were between 70 and 120% for cyantraniliprole and its metabolites as per Table 40. The chromatograms of control samples of spinach are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont-27747) supports the

storage durations/conditions of samples in the spinach side-by-side formulation bridging field trials reported in Table 41. No corrections to residues due to in-storage dissipation are necessary. Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the spinach side-by-side formulation bridging field trials with cyantraniliprole 40 WG using soil and foliar applications are reported in Table 42. A summary of residue data with the different application methods is presented in Table 43.

The maximum residue values of cyantraniliprole in/on spinach using the Syngenta water dispersible granule formulation (40 WG) were 0.016 ppm, 6.73 ppm, and 8.96 ppm following 1 soil application, 1 soil application + 2 foliar applications, and 3 foliar applications, respectively. Residue values for all metabolites, with the exception of IN-MYX98 and IN-J9Z38, were less than the LOQ (0.01 ppm) in/on spinach when treated as 1 soil application, 1 soil application + 2 foliar applications, and 3 foliar applications. The maximum residue level for IN-MYX98 was 0.118 ppm, and 0.184 ppm, following 1 soil + 2 foliar, and 3 foliar applications, respectively. The maximum residue level for IN-J9Z38 was 0.028 ppm, and 0.044 ppm, following 1 soil + 2 foliar, and 3 foliar applications, respectively.

The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 39: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Spinach samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Geno-Grinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One mL of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: Phenomenex Synergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSystems/MDS Sciex API 5000 mass spectrometer (MS/MS).
MRM Transitions	Cyantraniliprole/DPX-HGW86 (475/286); IN-N7B69 (491/286); IN-JCZ38 (493/462); IN-MYX98 (491/444); IN-MLA84 (443/298); IN-J9Z38 (457/299).
LOQ	0.010 mg/kg

Table 40: Summary of Concurrent Recoveries of Cyantraniliprole from Spinach.

Matrix	Spiking level (ppm)	Sample size(n)	Recoveries(%)	Mean ± SDEV(%)
Cyantraniliprole				
Spinach	0.01	1	102	NA
	10	1	95	NA
IN-N7B69				
Spinach	0.01	1	93	NA
	10	1	95	NA
IN-JCZ38				
Spinach	0.01	1	86	NA
	10	1	94	NA
IN-MYX98				
Spinach	0.01	1	97	NA
	10	1	100	NA
IN-MLA84				
Spinach	0.01	3	85	NA
	10	1	83	NA
IN-J9Z38				
Spinach	0.01	1	84	NA
	10	1	76	NA
IN-K7H19				
Spinach	0.01	1	105	NA
	10	1	96	NA

Table 41: Summary of Storage Conditions for Spinach.

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)
E14-9721 (GA/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Spinach	<-20 (±10°C)	3.7
W08-9722 (TX/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Spinach	<-20 (±10°C)	3.2
W29-9723 (CA/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Spinach	<-20 (±10°C)	3.3

Table 42: Cyantraniliprole Residue Results in/on Spinach.

Test ID (City, State/Region, Country, Year)	EP[a]	Crop/ Variety	Appl. Type	Total Rate (g ai/ha)	PHI (days)	Residues (ppm)						
						DPX-HGW 86	IN-N7B 69	IN-JCZ 38	IN-MYX 98	IN-MLA 84	IN-J9Z 38	IN-K7H 19
E14-9721 (Chula, GA, Region2, USA, 2009)	A16971B	Spinach/Space F1	Control	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			1 soil	201	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			1 soil + 2 foliar	452	1	6.5 6.7	<0.01 <0.01	<0.01 <0.01	0.11 0.12	<0.01 <0.01	0.028 0.027	<0.01 <0.01
			3 foliar	448	1	9.0 9.0	<0.01 <0.01	<0.01 <0.01	0.17 0.18	<0.01 <0.01	0.036 0.044	<0.01 <0.01
W08-9722 (Raymondville, TX, Region 6, USA, 2009)	A16971B	Spinach/Melody	Control	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			1 soil	203	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			1 soil + 2 foliar	457	1	4.2 3.9	<0.01 <0.01	<0.01 <0.01	0.056 0.047	<0.01 <0.01	0.024 0.025	<0.01 <0.01
			3 foliar	473	1	4.7 4.6	<0.01 <0.01	<0.01 <0.01	0.089 0.081	<0.01 <0.01	0.033 0.035	<0.01 <0.01
W29-9723 (Madera, CA, Region 10, USA, 2009)	A16971B	Spinach/Shasta	Control	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			1 soil	200	30	0.016 0.013	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			1 soil + 2 foliar	453	1	5.8 5.8	<0.01 <0.01	<0.01 <0.01	0.043 0.048	<0.01 <0.01	0.026 0.026	<0.01 <0.01
			3 foliar	458	1	6.8 6.7	<0.01 <0.01	<0.01 <0.01	0.087 0.091	<0.01 <0.01	0.041 0.039	<0.01 <0.01

[a] EP = End-use Product; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

Table 43: Summary of Residue Bridging Trial Data in/on Spinach.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI[a] (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
SPINACH (A16971B- 40 WG)									
Cyantraniliprole									
1 Soil Application	200-203	30	6	<0.01	0.016	0.014	0.01	0.011	0.003
1 Soil + 2 Foliar	452-457	1	6	3.9	6.8	6.6	5.8	5.5	1.2
3 Foliar	448-473	1	6	4.6	9.0	9.0	6.7	6.8	1.9
IN-N7B69									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	452-457	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	448-473	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	452-457	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	448-473	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	452-457	1	6	0.043	0.12	0.11	0.052	0.07	0.001
3 Foliar	448-473	1	6	0.081	0.18	0.18	0.090	0.12	0.047
IN-MLA84									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	452-457	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	448-473	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-J9Z38									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	452-457	1	6	0.024	0.028	0.027	0.026	0.026	0.001
3 Foliar	448-473	1	6	0.033	0.044	0.040	0.037	0.038	0.004
IN-K7H19									
1 Soil Application	200-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	452-457	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	448-473	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

[a]PHI: Pre-harvest interval; [b]HAFT: Highest Average Field Trial Value

III. CONCLUSION

Application of Syngenta water dispersible granule (WG) formulation was conducted in side-by-side plots to assess the residues of cyantraniliprole and its metabolites in/on spinach following a soil application (200-203g ai/ha; PHI of 30 days), a soil application followed by 2 foliar applications (452-457 g ai/ha; PHI of 1 day), and 3 foliar applications (448-473 g ai/ha; PHI of 1 day).

Average residues of cyantraniliprole in spinach were 0.011±0.003 ppm (soil application), and 5.5±1.2 ppm (soil + foliar applications), and 6.8±1.9 ppm (foliar applications). Residues of each metabolite were <0.01 ppm in spinach for all application methods, with the exception of 2 metabolites. Average residues of IN-MYX98 in spinach were 0.07±0.001 ppm (soil + foliar applications), and 0.12±0.05 ppm (foliar applications). Average residues of IN-J9Z38 in spinach were 0.026±0.001 ppm (soil + 2 foliar applications), and 0.038±0.004 ppm (foliar applications).

IIIA 7.6.1.12 USA Cyantraniliprole WG Formulation Hot Peppers Residue Bridging Study for Different Application Methods.

Report	Cyantraniliprole (A16971B) – Magnitude of the Residues in or on Hot peppers from Side-by-Side Bridging Trials to Comparing Soil and Foliar Applications.
Author	Johanna Mazlo
Report No.	T001427-09
Document No.	PMRA No. 2071519. MRID 48432518
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials each in/on hot peppers during the 2009 growing seasons in the United States with a side-by-side comparison of soil applications (drench), and foliar applications using Syngenta water dispersible granules (40 WG- A16971B). The first treatment was a drench soil application at 198-203 g ai/ha/season with a 30 day PHI and a spray volume of 142-838 L/ha. The second treatment involved a soil (24-day retreatment interval) and 2 foliar applications (5-day retreatment) for a total of 447-450 g ai/ha/season with a spray volume of 139-842 L/ha. Samples were collected at the normal commercial harvest date of 1 day. The third treatment involved three foliar applications (5-day retreatment interval) at a rate of 446-458 g ai/ha/season with a spray volume of 149 to 229 L/ha. Samples were collected at the normal harvest date of 1 day. A non-ionic surfactant was added to the spray mixture according to the label recommendation of the adjuvant. The number of trials and the geographical locations are given in Table 44. The study use pattern is given in Table 45.

Table 44: Trial Locations for Hot peppers.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
W07-9711	8	Uvalde/TX//USA/2009	Bridging MOR	Field
W28-9712	10	Fresno/CA//USA/2009	Bridging MOR	Field
W33-9713	10	King City/CA/USA/2009	Bridging MOR	Field

Table 45: Study Use Pattern for Hot Peppers.

Test ID(City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	Application Rate (g ai/ha)	RTI[b] (days)	Total Rate (g ai/ha)	
W07-9711 (Uvalde, TX, Region 8 USA, 2009)	A16971B (40 WG)	Soil drench/BBCH 73	142	201	--	201	None
	A16971B (40 WG)	Soil drench/BBCH 73	139	197	24	450	Induce 0.25% v/v
		Foliar broadcast/BBCH 85	165	100	5		
		Foliar broadcast/BBCH 88	148	153	--		
	A16971B (40 WG)	Foliar broadcast/BBCH 82	174	152	5	458	Induce 0.25% v/v
		Foliar broadcast/BBCH 85	167	153	5		
		Foliar broadcast/BBCH 88	149	153	--		
W28-9712 (Fresno, CA, Region 10, USA, 2009)	A16971B (40 WG)	Soil drench/Fruit to 2 in	838	198	--	198	None
	A16971B (40 WG)	Soil drench/Fruit to 2 in	842	199	24	447	Induce 0.5% v/v
		Foliar broadcast/Fruit to 3 in	187	100	5		
		Foliar broadcast/Fruit to 4	185	148	--		
	A16971B (40 WG)	Foliar broadcast/Fruit to 4 in	185	148	5	446	Induce 0.5% v/v
		Foliar broadcast/Fruit to 3 in	187	150	5		
		Foliar broadcast/Fruit to 4 in	184	147	--		
W33-9713 (King City,CA, Region 10 USA, 2009)	A16971B (40 WG)	Soil drench/BBCH 81	485	203	--	203	None
	A16971B (40 WG)	Soil drench/ BBCH 81	486	203	24	450	Dyne-Amic 0.38% v/v
		Foliar broadcast/ BBCH 85	220	97	5		
		Foliar broadcast/ BBCH 85	230	150	--		
	A16971B (40 WG)	Foliar broadcast/ BBCH 79	229	152	5	453	Dyne-Amic 0.38% v/v
		Foliar broadcast/ BBCH 85	223	149	5		
		Foliar broadcast/ BBCH 85	234	152	--		

[a] EP = End-use Product; A16971B is a wettable granular concentrate; [b]Retreatment Interval

II. Results and Discussion

DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on hot peppers. The procedural recoveries reported from spiking hot peppers at levels of 0.01 ppm (i.e. method LOQ), 0.5 ppm, and 1.0 ppm were between 70 and 120% for cyantraniliprole and its metabolites as per Table 47. The chromatograms of control samples of hot peppers are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27747) supports the

storage durations/conditions of samples in the hot peppers side-by-side formulation bridging field trials reported in Table 48. No corrections to residues due to in-storage dissipation are necessary.
Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the hot peppers side-by-side formulation bridging field trials with cyantraniliprole 40 WG using soil and foliar applications are reported in Table 49. A summary of residue data with the different application methods is presented in Table 50.

The maximum residue values of cyantraniliprole in/on hot peppers using the Syngenta water dispersible granule formulation (40 WG) were <0.01 ppm, 0.32 ppm, and 0.78 ppm following 1 soil application, 1 soil application + 2 foliar applications, and 3 foliar applications, respectively. Residue values for all metabolites were less than the LOQ (0.01 ppm) in/on hot peppers when treated as 1 soil application, 1 soil application + 2 foliar applications, and 3 foliar applications.

The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 46: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Spinach samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Geno-Grinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One mL of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: Phenomenex Synergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSystems/MDS Sciex API 5000 mass spectrometer (MS/MS).
MRM Transitions	Cyantraniliprole/DPX-HGW86 (475/286); IN-N7B69 (491/286); IN-JCZ38 (493/462); IN-MYX98 (491/444); IN-MLA84 (443/298); IN-J9Z38 (457/299).
LOQ	0.01 mg/kg

Table 47: Summary of Concurrent Recoveries of Cyantraniliprole from Hot peppers.

Matrix	Spiking level (ppm)	Sample size(n)	Recoveries(%)	Mean ± SDEV(%)
Cyantraniliprole				
Hot peppers	0.01	2	93, 107	100±7.0
	0.5	1	105	NA
	1.0	1	89	NA
IN-N7B69				
Hot peppers	0.01	1	96	NA
	1.0	1	87	NA
IN-JCZ38				
Hot peppers	0.01	1	94	NA
	1.0	1	94	NA
IN-MYX98				
Hot peppers	0.01	1	96	NA
	1.0	1	101	NA
IN-MLA84				
Hot peppers	0.01	1	105	NA
	1.0	1	96	NA
IN-J9Z38				
Hot peppers	0.01	1	76	NA
	1.0	1	85	NA
IN-K7H19				
Hot peppers	0.01	1	96	NA
	1.0	1	84	NA

Table 48: Summary of Storage Conditions for Hot Peppers.

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)
W07-9711 (TX/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Hot peppers	<-20 (±10°C)	9.2 4.8 9.2
W28-9712 (CA/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Hot peppers	<-20 (±10°C)	6.4 6.4 10.8
W33-9713 (CA/2009)	1 Soil 1 Soil + 2 Foliar 3 Foliar	Hot peppers	<-20 (±10°C)	6.2 6.2 6.2

Table 49: Cyantraniliprole Residue Results in/on Hot Peppers.

Test ID	EP[a]	Crop/ Variety	Appl. Type	Total Rate (g ai/ha)	PHI (days)	Residues (ppm)						
						DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
W07-9711 (Uvalde, TX, Region 8 USA, 2009)	A16971B	Mature Fruit Hot pepper/ *Jalapeno*	Control	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			1 soil	201	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			1 soil + 2 foliar	450	1	0.22 0.21	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			3 foliar	458	1	0.34, 0.33, 0.33, 0.23, 0.27, 0.26	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
W28-9712 (Fresno, CA, Region 10, USA, 2009)	A16971B	Mature Fruit Hot Pepper/ *Pace 105*	Control	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			1 soil	198	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			1 soil + 2 foliar	447	1	0.28 0.32	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			3 foliar	446	1	0.44, 0.49, 0.47, 0.78, 0.80, 0.72	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
W33-9713 (King City,CA, Region 10 USA, 2009)	A16971B	Mature Fruit Hot Pepper/ *Valour*	Control	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			1 soil	203	30	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			1 soil + 2 foliar	450	1	0.064 0.053	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			3 foliar	453	1	0.13 0.17	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

[a] EP = End-use Product; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

Table 50: Summary of Residue Bridging Trial Data in/on Hot Peppers.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI[a] (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
HOT PEPPERS (A16971B- 40 WG)									
Cyantraniliprole									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	0.053	0.32	0.30	0.22	0.19	0.11
3 Foliar	446-458	1	14	0.13	0.80	0.77	0.34	0.41	0.22
IN-N7B69									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-J9Z38									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
1 Soil Application	198-203	30	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
1 Soil + 2 Foliar	447-450	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
3 Foliar	446-458	1	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

[a] PHI: Pre-harvest interval; [b] HAFT: Highest Average Field Trial Value

III. CONCLUSION

Application of Syngenta water dispersible granule (WG) formulation was conducted in side-by-side plots to assess the residues of cyantraniliprole and its metabolites in/on hot peppers following a soil application (198-203 g ai/ha; PHI of 30 days), a soil application followed by 2 foliar applications (447-450 g ai/ha; PHI of 1 day), and 3 foliar applications (446-458 g ai/ha; PHI of 1 day). Residues of each metabolite were <0.01 ppm in hot peppers for all application methods. Average residues of cyantraniliprole in hot peppers were <0.01 ppm (soil application), and 0.19±0.11 ppm (soil + foliar applications), and 0.41±0.22 ppm (foliar applications).

IIIA 7.6.1.13 Cyantraniliprole SC and WG Formulations Residue Bridging Studies in Canada

The following studies are included for information purposes only. The studies were submitted to and reviewed by PMRA. They were not included in the Summary Document (D407962).

To support the WG premix formulation (cyantraniliprole and thiamethoxam; 1 to 1 ratio) use in Canada, Syngenta Canada performed studies on its WG premix formulation. The side-by-side bridging studies were established to compare the WG premix formulation and the suspension concentrate (SC) formulation from DuPont® were conducted on potatoes and mustard greens as in-furrow application at planting. In addition, the residues trials were also conducted on tomatoes and cucumbers using only the Syngenta WG pre-mix formulation as no detectable residues are expected from in-furrow use on these representative commodities. The Syngenta WG premix formulation will be used only as a single in-furrow at planting application in Canada.

Cyantraniliprole is the major component of the residues in raw agricultural crop commodities, although multiple analytes were measured as part of the working definition of the residue. Formulation bridging trials on a representative group of crops have shown comparable residues among formulation types.

The Syngenta residue studies included one in-furrow at planting application at a total rate of 300 g ai cyantraniliprole and thiamethoxam/ha (except for potatoes). The application rate for potatoes was 280 g ai cyantraniliprole and thiamethoxam/ha. The rates in these studies were selected to match the Syngenta Canada maximum label seasonal rates. These trials were performed on each of four representative crops (tomatoes, cucumbers, mustard greens, and potatoes).

Table 51: Syngenta Canada Bridging Residue Trial Design.

Formulations	Rate (g ai cyantraniliprole/ha)			
	Mustard Green	Potatoes	Tomatoes	Cucumbers
Syngenta 40 WG Premix*	150 in-furrow at planting	140 in-furrow at planting	150 in-furrow at planting	150 in –furrow at planting
DuPont SC Solo	150 in-furrow at planting	140 in-furrow at planting	Not included; detectable residues were not expected	Not included; detectable residues were not expected

*Application rate of thiamethoxam is equal the rate of cyantraniliprole since it is 1:1 ratio premix

Mustard greens, potatoes, tomatoes, and cucumbers were selected based on proposed Syngenta label uses as the most typically grown in Canada representative commodities of fruiting, leafy, brassica, cucurbits crop groups and potatoes. To cover leafy and brassica vegetable crop groups, mustard green is being utilized. Mustard green is selected because it is typically exhibits higher residue than other representative members of the brassica group and also mustard green is an equivalent surrogate for leaf lettuce (representative member of leafy crop group) since both display similar morphology.

The soil at planting application of the WG cyantraniliprole/thiamethoxam formulation on tomatoes resulted in residues below 0.01 ppm (< LOQ) for parent cyantraniliprole and its analyzed metabolites and for thiamethoxam and its analyzed metabolite. The soil at planting application of the WG cyantraniliprole/thiamethoxam formulation on cucumbers resulted in residues below 0.01 ppm (< LOQ) for parent cyantraniliprole and its analyzed metabolites. Measurable but very low residues of thiamethoxam parent at levels of 0.015 and 0.020 ppm were observed in the two treated cucumber samples. There were no residues of thiamethoxam parent detected at or above LOQ in any other cucumber samples and all tomato samples. There were no residues of thiamethoxam metabolite (CGA-322704) detected at or above the LOQ in any cucumber and tomato samples. The soil at planting application on mustard green and potatoes resulted in low but measurable residues of both active ingredients. Residues of cyantraniliprole were comparable between the Syngenta WG and DuPont® SC formulation. Residues of thiamethoxam were comparable between Syngenta WG premix formulation and Actara 240 SC formulation.

IIA 7.6.1.13 Canada Cyantraniliprole WG Formulation Residue Study in/ Cucumbers for an In-Furrow Soil Application.

Report	Cyantraniliprole/Thiamethoxam WG (A16901B) – Residue Levels on Cucumbers from Trials Conducted in Canada During 2010.
Author	Karen Sagan
Report No.	CER 06404/10
Document No.	PMRA No. 2071464
Guidelines	PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, Canada, Inc.
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials each in/on cucumbers during the 2010 growing seasons in the Canada using a single in-furrow drench soil application (150 g ai/ha/season) using Syngenta water dispersible granules (Cyantraniliprole/Thiamethoxam 40 WG- A16901B). Spray volumes ranged from 1914 to 2116 L/ha. Samples were collected at the normal harvest date of 54 to 60 days. No surfactant was added to the spray mixture.

Table 52: Trial Locations for Cucumbers.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
T831	5	Branchton/ON/Canada/2010	MOR	Field
T832	5	St.-Marc-sur-Richelieu/QC/2010	MOR	Field
T833	12	Abbotsford/BC/Canada/2010	MOR	Field

Table 53: Study Use Pattern for Cucumbers.

Test ID(City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	Application Rate (g ai/ha)	RTI[b] (days)	Total Rate (g ai/ha)	
T831 (Branchton/ON/Region 5/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ BBCH 10-12	1914	150	--	150	None
T832(St.-Marc-sur-Richelieu/QC/Region 5/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ BBCH 10-12	2116	150	--	150	None
T833(Abbotsford/BC/Region 12/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ BBCH 10-12	1920	150	--	150	None

[a] EP = End-use Product; A15929B is an oil dispersion concentrate; A16971B is a wettable granular concentrate; [b]Retreatment Interval

II. Results and Discussion

The principle of the analytical method used to quantify the analytes in the RACs is briefly summarized in Table 54. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on cucumbers. The procedural recoveries reported from spiking cucumbers at levels of 0.01 ppm (i.e. method LOQ), and 10 ppm were between 70 and 120% for cyantraniliprole and its metabolites as per Table 55. Only two values were observed above 120% (112%) when cucumber samples were spiked with either IN-N7B69, or IN-K7H19. The chromatograms of control samples of cucumbers are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27747) supports the storage durations/conditions of samples in the cucumber field trials reported in Table 56. No corrections to residues due to in-storage dissipation are necessary.
Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the cucumber field trials with cyantraniliprole 40 WG using an in-furrow drench soil application are reported in Table 57. A summary of residue data is presented in Table 58.

All residue levels were less than the LOQ of 0.01 ppm. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 54: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Cucumber samples were extracted twice with acetonitrile:water (90:10, v/v) by homogenization. Extracts were then centrifuged to separate the supernatant from the solid sample. The volume was adjusted to 50 mL with acetonitrile:water (90:10, v/v). An aliquot was filtered through a 0.2 µm PTFE filter disc into a disposable vial. An aliquot of the filtered extract was diluted with methanol and water.
Cleanup Strategies	None
Chromatography	HPLC: Zorbax SB-C8, 100 mm × 2.1 mm i.d., 3.5 µm particle size
Detection	Applied BioSystems/MDS Sciex 4000 Q-Trap High Performance Liquid Chromatography with triple quadrupole mass spectrometric detection (LC-MS/MS).
MRM Transitions	Cyantraniliprole/DPX-HGW86 (475/286); IN-N7B69 (491/286); IN-JCZ38 (493/462); IN-MYX98 (491/444); IN-MLA84 (443/298); IN-J9Z38 (457/299).
LOQ	0.010 mg/kg

Table 55: Summary of Concurrent Recoveries of Cyantraniliprole and Metabolites from Cucumbers.

Matrix	Spiking level (ppm)	Sample size (n)	Recoveries (%)	Mean ± std. dev. (CV) (% ± % (%))
Cyantraniliprole				
Cucumber Fruit	0.01	3	112, 115, 110	112 ± 2.5 (2.2)
	0.10	3	119, 114, 105	113 ± 7.1 (6.3)
IN-N7B69				
Cucumber Fruit	0.01	3	118, 86, 118	107 ± 18 (17)
	0.10	3	122, 109, 107	113 ± 8.1 (7.2)
IN-JCZ38				
Cucumber Fruit	0.01	3	120, 114, 109	114 ± 5.5 (4.8)
	0.10	3	114, 108, 107	110 ± 3.8 (3.5)
IN-K7H19				
Cucumber Fruit	0.01	3	99, 122, 102	108 ± 13 (12)
	0.10	3	116, 119, 102	112 ± 9.1 (8.1)
IN-MYX98				
Cucumber Fruit	0.01	3	120, 113, 113	115 ± 4.0 (3.5)
	0.10	3	115, 112, 98	108 ± 9.1 (8.4)
IN-MLA84				
Cucumber Fruit	0.01	3	115, 103, 76	98 ± 20 (20)
	0.10	3	115, 116, 108	113 ± 4.4 (3.9)
IN-J9Z38				
Cucumber Fruit	0.01	3	113, 96, 94	101 ± 10 (10)
	0.10	3	114, 113, 98	108 ± 9.0 (8.3)

Table 56: Summary of Storage Conditions for Cucumbers.

Trial ID	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (months)
T831 (Branchton/ON/Region 5/CAN/2010	In-furrow soil	Cucumber	-10	3.3
T832 (St.-Marc-sur-Richelieu/QC/Region5/CAN/2010)	In-furrow soil	Cucumber	-10	3.8
T833 (Abbotsford/BC/Region 12/CAN/2010)	In-furrow soil	Cucumber	-10	2.9

Table 57: Cyantraniliprole Residue Results in/on Cucumbers.

Test ID (City, State/Region, Country, Year)	EP[a]	Crop/ Variety	Total Rate (g ai/ha)	PHI (days)	Residues (ppm)						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
T831 (Branchton/ON/ Region 5/CAN/2010)	A16901B	Cucumber/ Talledega	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			150	60	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
T832(St.-Marc-sur-Richelieu/QC/ Region 5/CAN/2010)	A16901B	Cucumber/ Market More	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			150	55	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
T833(Abbotsford/ BC/Region 12/CAN/2010)	A16901B	Cucumber/ Stonewall	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			50	54	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

[a] EP = End-use Product; A16901B (Cyantraniliprole/Thiamethoxam 40 WG) is a wettable granular concentration that contains 20 % w/w cyantraniliprole and 20% thiamethoxam.

Table 58: Summary of Residue Bridging Trial Data in/on Cucumbers.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI[a] (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
Cucumbers (A16901B- 40 WG)									
Cyantraniliprole									
Single in-furrow spray/drench	150	54-60	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Single in-furrow spray/drench	150	54-60	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Single in-furrow spray/drench	150	54-60	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Single in-furrow spray/drench	150	54-60	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Single in-furrow spray/drench	150	54-60	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-J9Z38									
Single in-furrow spray/drench	150	54-60	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Single in-furrow spray/drench	150	54-60	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

[a] PHI: Pre-harvest interval; [b] HAFT: Highest Average Field Trial Value

III. CONCLUSION

Application of Syngenta water dispersible granule (WG) formulation was conducted to assess the residues of cyantraniliprole and its metabolites in/on cucumbers following a single in-furrow spray drench application (150 g ai/ha; PHI of 54-60 days) with spray volumes between 1914 to 2116 L/ha. Residues of cyantraniliprole and each metabolite were <0.01 ppm in cucumbers.

IIIA 8.10 Canada Cyantraniliprole WG Formulation Residue Study in/ Tomatoes using In-Furrow Soil Application Method.

Report	Cyantraniliprole/Thiamethoxam WG (A16901B) – Residue Levels on Tomatoes from Trials Conducted in Canada During 2010.
Author	Karen Sagan
Report No.	CER 06402/10
Document No.	PMRA No. 2071531
Guidelines	PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, Canada, Inc.
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials each in/on tomatoes during the 2010 growing seasons in the Canada using a single in-furrow drench soil application (150 g ai/ha/season) using Syngenta water dispersible granules (Cyantraniliprole/Thiamethoxam 40 WG- A16901B). Spray volumes ranged from 1880 to 2123 L/ha. Samples were collected at the normal harvest date of 76 to 88 days. No surfactant was added to the spray mixture. The location for trials conducted is reported in Table 59. The study use pattern for tomatoes in reported in Table 60.

Table 59: Trial Locations for Tomatoes.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
T825	5	Branchton/ON/Canada/2010	MOR	Field
T826	5	Branchton/ON/Canada/2010	MOR	Field
T827	5	St.-Marc-sur-Richelieu/QC/2010	MOR	Field

Table 60: Study Use Pattern for Tomatoes.

Test ID(City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	Application Rate (g ai/ha)	RTI[b] (days)	Total Rate (g ai/ha)	
T825 (Branchton/ON/Region 5/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ BBCH 10-12	1880	150	--	150	None
T826 (Branchton/ON/Region 5/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ BBCH 10-12	1940	150	--	150	None
T827(St.-Marc-sur-Richelieu/QC/Region 5/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ BBCH 10-12	2123	150	--	150	None

[a] EP = End-use Product; A15929B is an oil dispersion concentrate; A16971B is a wettable granular concentrate; [b]Retreatment Interval

II. Results and Discussion

The principle of the analytical method used to quantify the analytes in the RACs is briefly summarized in Table 61. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on tomatoes. The procedural recoveries reported from spiking tomatoes at levels of 0.01 ppm (i.e. method LOQ), and 0.1 ppm were mostly between 70 and 120% for cyantraniliprole and its metabolites as per Table 62. Although a few recoveries were above 120%, there is sufficient data to demonstrate the acceptability of the method. The chromatograms of control samples of tomatoes are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27747) supports the storage durations/conditions of samples in the tomato field trials reported in Table 63. No corrections to residues due to in-storage dissipation are necessary.
Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the tomato field trials with cyantraniliprole 40 WG using an in-furrow drench soil application are reported in Table 64. A summary of residue data is presented in Table 65.

All residue levels of cyantraniliprole and the metabolites were less than the LOQ of 0.01 ppm. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 61: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Tomato samples were extracted twice with acetonitrile:water (90:10, v/v) by homogenization. Extracts were then centrifuged to separate the supernatant from the solid sample. The volume was adjusted to 50 mL with acetonitrile:water (90:10, v/v). An aliquot was filtered through a 0.2 µm PTFE filter disc into a disposable vial. An aliquot of the filtered extract was diluted with methanol and water.
Cleanup Strategies	None
Chromatography	HPLC: Zorbax SB-C8, 100 mm × 2.1 mm i.d., 3.5 µm particle size
Detection	Applied BioSystems/MDS Sciex 4000 Q-Trap High Performance Liquid Chromatography with triple quadrupole mass spectrometric detection (LC-MS/MS).
MRM Transitions	Cyantraniliprole/DPX-HGW86 (475/286); IN-N7B69 (491/286); IN-JCZ38 (493/462); IN-MYX98 (491/444); IN-MLA84 (443/298); IN-J9Z38 (457/299).
LOQ	0.010 mg/kg

Table 62: Summary of Concurrent Recoveries of Cyantraniliprole and Metabolites from Tomatoes.

Matrix	Spiking level (ppm)	Sample size (n)	Recoveries (%)	Mean ± std. dev. (CV) (% ± % (%))
Cyantraniliprole				
Tomato	0.01	3	121, 112, 105	113 ± 8.0 (7.1)
	0.10	3	115, 118, 95	109 ± 13 (12)
IN-N7B69				
Tomato	0.01	3	107, 116, 112	112 ± 4.5 (4.0)
	0.10	3	111, 122, 99	111 ± 12 (11)
IN-JCZ38				
Tomato	0.01	3	118, 111, 97	109± 11 (10)
	0.10	3	105, 119, 98	107 ± 11 (10)
IN-K7H19				
Tomato	0.01	3	112, 125, 103	113 ± 11 (9.8)
	0.10	3	105, 102, 106	104 ± 2.1 (2.0)
IN-MYX98				
Tomato	0.01	3	119, 100, 108	109 ± 9.5 (8.8)
	0.10	3	104, 110, 99	104 ± 5.5 (5.3)
IN-MLA84				
Tomato	0.01	3	119, 131, 91	114 ± 21 (18)
	0.10	3	119, 121, 96	112 ± 14 (12)
IN-J9Z38				
Tomato	0.01	3	119, 105, 87	104 ± 16 (16)
	0.10	3	108, 116, 106	110 ± 5.3 (4.8)

Table 63: Summary of Storage Conditions for Tomatoes.

Trial ID	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (months)
T825 (Branchton/ON/Region 5/CAN/2010	In-furrow soil	Tomatoes	-10	2.4
T826 (Branchton/ON/Region 5/CAN/2010	In-furrow soil	Tomatoes	-10	2.4
T827 (St.-Marc-sur-Richelieu/QC/Region5/CAN/2010)	In-furrow soil	Tomatoes	-10	5.2

Table 64: Cyantraniliprole Residue Results in/on Tomatoes.

Test ID (City, State/Region, Country, Year)	EP[a]	Crop/ Variety	Total Rate (g ai/ha)	PHI (days)	Residues (ppm)						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
T825 (Branchton/ON/ Region 5/CAN/2010)	A16901B	Tomato/TSH-18	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			150	88	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
T826 (Branchton/ON/ Region 5/CAN/2010)	A16901B	Tomato/TSH-25	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			150	88	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
T827(St.-Marc-sur-Richelieu/QC/ Region 5/CAN/2010)	A16901B	Tomato/410	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			150	76	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

[a] EP = End-use Product; A16901B (Cyantraniliprole/Thiamethoxam 40 WG) is a wettable granular concentration that contains 20 % w/w cyantraniliprole and 20% thiamethoxam.

Table 65: Summary of Residue Bridging Trial Data in/on Tomatoes.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI[a] (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
Tomatoes (A16901B- 40 WG)									
Cyantraniliprole									
Single in-furrow spray/drench	150	76-88	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Single in-furrow spray/drench	150	76-88	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Single in-furrow spray/drench	150	76-88	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Single in-furrow spray/drench	150	76-88	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Single in-furrow spray/drench	150	76-88	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-J9Z38									
Single in-furrow spray/drench	150	76-88	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Single in-furrow spray/drench	150	76-88	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

[a] PHI: Pre-harvest interval; [b] HAFT: Highest Average Field Trial Value

III. CONCLUSION

Application of Syngenta water dispersible granule (WG) formulation was conducted to assess the residues of cyantraniliprole and its metabolites in/on tomatoes following a single in-furrow spray drench application (150 g ai/ha; PHI of 76-88 days) with spray volumes between 1880 to 2123 L/ha. Residues of cyantraniliprole and each metabolite were <0.01 ppm in tomatoes.

IIIA 8.1.11 Canada Cyantraniliprole WG Formulation Bridging Residue Study in/ Mustard Greens using In-Furrow Soil Application Method.

Report	Cyantraniliprole/Thiamethoxam WG (A16901B) – Residue Levels on Mustard Greens from Trials Conducted in Canada During 2010.
Author	Karen Sagan
Report No.	CER 06403/10
Document No.	PMRA No. 2071462
Guidelines	PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, Canada, Inc.
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials each in/on mustard greens during the 2010 growing seasons in the Canada using a single in-furrow drench soil application (150 g ai/ha/season) using Syngenta water dispersible granules (Cyantraniliprole/Thiamethoxam 40 WG- A16901B). Spray volumes ranged from 1880 to 2123 L/ha. Samples were collected at the normal harvest date of 76 to 88 days. No surfactant was added to the spray mixture. The location of the trials conducted is reported in Table 66. The study use pattern for mustard greens is reported in Table 67.

Table 66: Trial Locations for Mustard Greens.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
T828	5	Branchton/ON/CAN/2010	MOR	Field
T829	5	St.-Marc-sur-Richelieu/QC/CAN/2010	MOR	Field
T830	12	Abbotsford/BC/CAN/2010	MOR	Field

Table 67: Study Use Pattern for Mustard Greens.

Test ID(City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	Application Rate (g ai/ha)	RTI[b] (days)	Total Rate (g ai/ha)	
T828 (Branchton/ON/Region 5/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ BBCH 14-15	2000	150	--	150	None
	200SC					150	
T829(St.-Marc-sur-Richelieu/QC/Region 5/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ Not recorded	2000	150	--	150	None
	200 SC					150	
T830 (Abbotsford/BC/Region 12/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ BBCH 14-32	2000	150	--	150	None
	200 SC					150	

[a] EP = End-use Product; A15929B is an oil dispersion concentrate; A16971B is a wettable granular concentrate; Cyantraniliprole 200SC is a liquid concentration that contains 200 g cyantraniliprole/L)
; [b]Retreatment Interval

II. Results and Discussion

The analytical method is briefly described in Table 68. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on mustard greens. The procedural recoveries reported from spiking mustard greens at levels of 0.01 ppm (i.e. method LOQ), and 0.10 ppm were mostly between 70 and 120% for cyantraniliprole and its metabolites as per Table 69. The chromatograms of control samples of mustard greens are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27747) supports the storage durations/conditions of samples in the mustard green field trials reported in Table 70. No corrections to residues due to in-storage dissipation are necessary.
Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the mustard green field trials with cyantraniliprole 40 WG using an in-furrow drench soil application are reported in Table 71. A summary of residue data is presented in Table 72.

The maximum residues of cyantraniliprole were 0.037 ppm and 0.07 ppm following a single in-furrow treatment of mustard greens with the A16901B (40WG) and the 200 SC formulated products, respectively. All residue levels of the metabolites were less than the LOQ of 0.01 ppm. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 68: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Mustard green samples were extracted twice with acetonitrile:water (90:10, v/v) by homogenization. Extracts were then centrifuged to separate the supernatant from the solid sample. The volume was adjusted to 50 mL with acetonitrile:water (90:10, v/v). An aliquot was filtered through a 0.2 µm PTFE filter disc into a disposable vial. An aliquot of the filtered extract was diluted with methanol and water.
Cleanup Strategies	None
Chromatography	HPLC: Zorbax SB-C8, 100 mm × 2.1 mm i.d., 3.5 µm particle size
Detection	Applied BioSystems/MDS Sciex 4000 Q-Trap High Performance Liquid Chromatography with triple quadrupole mass spectrometric detection (LC-MS/MS).
MRM Transitions	Cyantraniliprole/DPX-HGW86 (475/286); IN-N7B69 (491/286); IN-JCZ38 (493/462); IN-MYX98 (491/444); IN-MLA84 (443/298); IN-J9Z38 (457/299).
LOQ	0.010 mg/kg

Table 69: Summary of Concurrent Recoveries of Cyantraniliprole and Metabolites from Mustard Greens.

Matrix	Spiking level (ppm)	Sample size (n)	Recoveries (%)	Mean ± std. dev. (% ± %)
Cyantraniliprole				
Mustard greens	0.01	3	110, 98, 83	97 ± 14
	0.10	3	98, 98, 77	91 ± 12
IN-N7B69				
Mustard greens	0.01	3	107, 115, 111	111 ± 4.0
	0.10	3	94, 100, 71	88 ± 15
IN-JCZ38				
Mustard greens	0.01	3	99, 105, 78	94± 14
	0.10	3	96, 102, 70	89 ± 17
IN-K7H19				
Mustard greens	0.01	3	109, 108, 79	99 ± 17
	0.10	3	99, 104, 66	90 ± 21
IN-MYX98				
Mustard greens	0.01	3	103, 94, 74	90 ± 15
	0.10	3	92, 97, 64	84 ± 7.0
IN-MLA84				
Mustard greens	0.01	3	107, 95, 77	93 ± 15
	0.10	3	87, 89, 76	84 ± 7.0
IN-J9Z38				
Mustard greens	0.01	3	84, 113, 84	94 ± 17
	0.10	3	78, 90, 85	84 ± 6.0

Table 70: Summary of Storage Conditions for Mustard Greens.

Trial ID	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (months)
T828 (Branchton/ON/Region 5/CAN/2010	In-furrow soil	Mustard greens	-10	3.9
T829 (St.-Marc-sur-Richelieu/QC/Region5/CAN/2010)	In-furrow soil	Mustard greens	-10	4.6
T830 (Abbotsford/BC/Region 12/CAN/2010)	In-furrow soil	Mustard greens	-10	2.5

Table 71: Cyantraniliprole Residue Results in/on Mustard Greens.

Test ID (City, State/Region, Country, Year)	EP[a]	Crop/ Variety	Total Rate (g ai/ha)	PHI (days)	Residues (ppm)						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
T828 (Branchton/ON/ Region 5/CAN/2010)	A16901B	Mustard greens/Florida Broadleaf	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	200 SC		150	40	0.037 0.036	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			150	40	0.063 0.070	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
T829(St.-Marc-sur-Richelieu/QC/ Region 5/CAN/2010)	A16901B	Mustard greens/Florida	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	200 SC		150	28	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			150	28	0.015 0.012	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
T830 (Abbotsford/BC /Region 12/CAN/2010)	A16901B	Mustard greens/Ruby Streaks	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	200 SC		150	46	0.034 0.032	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
			150	46	0.046 0.035	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

[a] EP = End-use Product; A16901B (Cyantraniliprole/Thiamethoxam 40 WG) is a wettable granular concentration that contains 20 % w/w cyantraniliprole and 20% thiamethoxam. Cyantraniliprole 200SC is a liquid concentration that contains 200 g cyantraniliprole/L)

Table 72: Summary of Residue Bridging Trial Data in/on Mustard Greens.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI[a] (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
Cyantraniliprole									
Single in-furrow spray/drench/A16901B	150	28-46	6	<0.01	0.037	0.037	0.033	0.027	0.013
Single in-furrow spray/drench/200 SC	150	28-46	6	0.012	0.07	0.067	0.041	0.040	0.024
IN-N7B69									
Single in-furrow spray/drench/A16901B	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Single in-furrow spray/drench/A16901B	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Single in-furrow spray/drench/A16901B	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Single in-furrow spray/drench/A16901B	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

Table 72: Summary of Residue Bridging Trial Data in/on Mustard Greens.

IN-J9Z38									
Single in-furrow spray/drench/A16901B	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Single in-furrow spray/drench/A16901B	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	150	28-46	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

0 EP: End-use product [a] PHI: Pre-harvest interval; [b] HAFT: Highest Average Field Trial Value

III. CONCLUSION

Application of Syngenta water dispersible granule cyantraniliprole/thiamethoxam (40 WG) formulation and a liquid formulation 200 SC was conducted to assess the residues of cyantraniliprole and its metabolites in/on mustard greens following a single in-furrow spray drench application (150 g ai/ha; PHI of 28-46 days) with spray volumes between 2000 L/ha. Average residues of cyantraniliprole were 0.027±0.013 ppm (A16901B) and 0.040±0.024 ppm (200 SC) for the two different formulated products. Residues of each metabolite for both formulated products were <0.01 ppm in mustard greens.

IIIA 8.1.12 Canada Cyantraniliprole WG Formulation Bridging Residue Study in/ Potatoes using In-Furrow Soil Application Method.

Report	Cyantraniliprole/Thiamethoxam WG (A16901B) – Residue Levels on Potatoes from Trials Conducted in Canada During 2010.
Author	Karen Sagan
Report No.	CER 06401/10
Document No.	PMRA No. 2071526
Guidelines	PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, Canada, Inc.
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials each in/on potatoes during the 2010 growing seasons in the Canada using a single in-furrow drench soil application (150 g ai/ha/season) using Syngenta water dispersible granules (Cyantraniliprole/Thiamethoxam 40 WG- A16901B). Spray volumes ranged from 1880 to 2123 L/ha. Samples were collected at the normal harvest date of 76 to 88 days. No surfactant was added to the spray mixture. The trial locations and study use pattern are reported in Tables 73 and 74.

Table 73: Trial Locations for Potatoes.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
T822	1	New Glasgow/PE/CAN/2010	MOR	Field
T823	5	Branchton/ON/CAN/2010	MOR	Field
T824	12	Abbotsford/BC/CAN/2010	MOR	Field

Table 74: Study Use Pattern for Potatoes.

Test ID(City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	Application Rate (g ai/ha)	RTI[b] (days)	Total Rate (g ai/ha)	
T822 (New Glasgow/PE/Region 1/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ BBCH 409	51	140	--	140	None
	200SC		49	140		140	
T823 (Branchton/ON/Region 5/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ BBCH 97-99	51	140	--	140	None
	200 SC		51	140		140	
T824 (Abbotsford/BC/Region 12/CAN/2010)	A16901B (40 WG)	In-furrow spray/drench/ BBCH 47-49	52	140	--	140	None
	200 SC		50	140		140	

[a] EP = End-use Product; A15929B is an oil dispersion concentrate; A16971B is a wettable granular concentrate; Cyantraniliprole 200SC is a liquid concentration that contains 200 g cyantraniliprole/L)
; [b]Retreatment Interval

II. Results and Discussion

The principle of the analytical method used to quantify the analytes in the RACs is briefly summarized in Table 75. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on potatoes. The procedural recoveries reported from spiking potatoes at levels of 0.01 ppm (i.e. method LOQ), and 0.10 ppm were mostly between 70 and 120% for cyantraniliprole and its metabolites as per Table 76. Although, some recovery values for the metabolites were outside the range of acceptability, the standard deviations and coefficient of variance were within guideline levels. The chromatograms of control samples of potatoes are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.
The storage stability study (refer to Document M-II Section 4 in DuPont - 27747) supports the storage durations/conditions of samples in the potato field trials reported in Table 77. No corrections to residues due to in-storage dissipation are necessary.
Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the potato field trials with cyantraniliprole 40 WG using an in-furrow drench soil application are reported in Table 78. A summary of residue data is presented in Table 79.

The maximum residues of cyantraniliprole in or on potatoes were 0.037 ppm (A16901B) and 0.035 ppm (200 SC). All residue levels for the metabolites were less than the LOQ of 0.01 ppm. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 75: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Potato samples were extracted twice with acetonitrile:water (90:10, v/v) by homogenization. Extracts were then centrifuged to separate the supernatant from the solid sample. The volume was adjusted to 50 mL with acetonitrile:water (90:10, v/v). An aliquot was filtered through a 0.2 µm PTFE filter disc into a disposable vial. An aliquot of the filtered extract was diluted with methanol and water.
Cleanup Strategies	None
Chromatography	HPLC: Zorbax SB-C8, 100 mm × 2.1 mm i.d., 3.5 µm particle size
Detection	Applied BioSystems/MDS Sciex 4000 Q-Trap High Performance Liquid Chromatography with triple quadrupole mass spectrometric detection (LC-MS/MS).
MRM Transitions	Cyantraniliprole/DPX-HGW86 (475/286); IN-N7B69 (491/286); IN-JCZ38 (493/462); IN-MYX98 (491/444); IN-MLA84 (443/298); IN-J9Z38 (457/299).
LOQ	0.010 mg/kg

Table 76: Summary of Concurrent Recoveries of Cyantraniliprole and Metabolites from Potatoes.

Matrix	Spiking level (ppm)	Sample size (n)	Recoveries (%)	Mean ± std. dev.(CV) (% ± %± %)
Cyantraniliprole				
Potatoes	0.01	3	95, 104, 91	97 ± 6.7 (6.9)
	0.10	3	103, 95, 100	99 ± 4.0 (4.1)
IN-N7B69				
Potatoes	0.01	3	100, 94, 80	91 ± 10 (11)
	0.10	3	104, 105, 97	102 ± 4.4 (4.3)
IN-JCZ38				
Potatoes	0.01	3	106, 113, 102	107± 5.6 (5.2)
	0.10	3	105, 98, 95	99 ± 5.1 (5.2)
IN-K7H19				
Potatoes	0.01	3	105, 107, 114	109 ± 4.7 (4.3)
	0.10	3	103, 103, 105	104 ± 1.2 (1.1)
IN-MYX98				
Potatoes	0.01	3	101, 90, 91	94 ± 6.1 (6.5)
	0.10	3	96, 100, 97	98 ± 2.1 (2.1)
IN-MLA84				
Potatoes	0.01	3	116, 116, 132	121 ± 9.2 (7.6)
	0.10	3	118, 114, 110	114 ± 4.0 (3.5)
IN-J9Z38				
Potatoes	0.01	3	118, 118, 150	129 ± 18 (14)
	0.10	3	123, 98, 118	113 ± 13 (12)

Table 77: Summary of Storage Conditions for Potatoes.

Trial ID	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (months)
T822 (New Glasgow/PE/Region 1/CAN/2010)	In-furrow soil	Potatoes	-10	2.8
T823 (Branchton/ON/Region 5/CAN/2010)	In-furrow soil	Potatoes	-10	3.1
T824 (Abbotsford/BC/Region 12/CAN/2010)	In-furrow soil	Potatoes	-10	1.2

Table 78: Cyantraniliprole Residue Results in/on Potatoes.

Test ID (City, State/Region, Country, Year)	EP[a]	Crop/ Variety	Total Rate (g ai/ha)	PHI (days)	Residues (ppm)						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
T822 (New Glasgow/PE/Region 1/CAN/2010)	A16901B/ 200 SC	Potatoes/Norland	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16901B		140	90	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
	200 SC		140	90	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
T823 (Branchton/ON/ Region 5/CAN/2010)	A16901B/ 200 SC	Potatoes/Norland	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16901B		140	91	<0.01 0.015	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
	200 SC		140	91	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
T824 (Abbotsford/BC /Region 12/CAN/2010)	A16901B/ 200 SC	Potatoes/Russett Burbank	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16901B		140	105	0.037 0.024	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
	200 SC		140	105	0.035 0.032	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

[a] EP = End-use Product; A16901B (Cyantraniliprole/Thiamethoxam 40 WG) is a wettable granular concentration that contains 20 % w/w cyantraniliprole and 20% thiamethoxam. Cyantraniliprole 200SC is a liquid concentration that contains 200 g cyantraniliprole/L)

Table 79: Summary of Residue Bridging Trial Data in/on Potatoes.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI[a] (days)	Residue Levels (ppm)						
			n	Min.	Max.	HAFT[b]	Median	Mean	SDEV
Cyantraniliprole									
Single in-furrow spray/drench/A16901B	140	90-105	6	<0.01	0.037	0.031	0.0125	0.018	0.011
Single in-furrow spray/drench/200 SC	140	90-105	6	<0.01	0.035	0.034	0.01	0.018	0.012
IN-N7B69									
Single in-furrow spray/drench/A16901B	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Single in-furrow spray/drench/A16901B	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Single in-furrow spray/drench/A16901B	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Single in-furrow spray/drench/A16901B	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

Table 79: Summary of Residue Bridging Trial Data in/on Potatoes.

IN-J9Z38									
Single in-furrow spray/drench/A16901B	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Single in-furrow spray/drench/A16901B	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--
Single in-furrow spray/drench/200 SC	140	90-105	6	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] EP: End-use product [a] PHI: Pre-harvest interval; [b] HAFT: Highest Average Field Trial Value

III. CONCLUSION

Application of Syngenta water dispersible granule cyantraniliprole/thiamethoxam (40 WG) formulation and a liquid formulation 200 SC was conducted to assess the residues of cyantraniliprole and its metabolites in/on potatoes following a single in-furrow spray drench application (140 g ai/ha; PHI of 90-105 days) with spray volumes between 49-52 L/ha. Average residues of cyantraniliprole were 0.018±0.0113 ppm (A16901B) and 0.018±0.012 ppm (200 SC) for the two different formulated products. Residues of each metabolite for both formulated products were <0.01 ppm in potatoes.

Primary Evaluator _____ Date: 01/31/2013
Stephen Funk, Senior Scientist, RAB III

Approved by _____ Date:01/31/2013
Jeff Dawson, Acting Branch Chief, RAB III

Attached in OECD format are the Syngenta bridging field trials for head lettuce, bell pepper, summer squash, cucumber, and tomato, MRIDs 48757902- 48758906.

B.7.6.1.1 – B.7.6.1.5 SYNGENTA CROP FIELD TRIALS FROM NAFTA REGIONS

OCSPP 860.1500
MRIDs 48758902 - 48758906

IIIA 7.6.1 Residues Resulting from Supervised Field Trials

IIIA 7.6.1.1: USA Head Lettuce Formulation Bridging Trials

Report	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Head Lettuce from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations
Author	Johanna Mazlo
Report No.	TK0056884
Document No.	PMRA No. 2200369 MRID No. 48758902
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials in/on head lettuce during the 2011 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 150 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 193-293 L/ha for a maximum seasonal rate of 450 g ai/ha/season. Samples were collected at the normal commercial harvest date of 1 day. A non-ionic surfactant was added to the spray mixture according to the label recommendation of the adjuvant. The number of trials and the geographical locations are given in Table 1. The study use pattern is given in Table 2.

Table 1: Trial Locations for Head Lettuce.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
Syngenta TK0056884, TK0056884-01	2	Athens, Georgia, USA, 2011	Bridging MOR	field
Syngenta TK0056884, TK0056884-02	3	Oviedo, Florida, USA, 2011	Bridging MOR	field
Syngenta TK0056884, TK0056884-03	10	King City, California, USA, 2011	Bridging MOR	field

Table 2: Study Use Pattern for Head Lettuce.

Test ID (City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing[b]	Vol (L/ha)	g ai/ha	RTI[c] (days)	Total Rate (g ai/ha)	
TK0056884-01(Athens, Georgia, USA, 2011)	A15929B	Foliar broadcast/ BBCH 47	193-216	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 48		150	5		
		Foliar broadcast/ BBCH 49		150	--		
	A16971B	Foliar broadcast/ BBCH 47	193-216	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 48		150	5		
		Foliar broadcast/ BBCH 49		150	--		
	A15929B	Foliar broadcast/ BBCH 47	193-216	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 48		150	5		
		Foliar broadcast/ BBCH 49		150	--		
	A16971B	Foliar broadcast/ BBCH 47	193-216	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 48		150	5		
		Foliar broadcast/ BBCH 49		150	--		
	A15929B	Foliar broadcast/ BBCH 47	193-216	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 48		150	5		
		Foliar broadcast/ BBCH 49		150	--		
	A16971B	Foliar broadcast/ BBCH 47	193-216	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 48		150	5		
		Foliar broadcast/ BBCH 49		150	--		

Table 2: Study Use Pattern for Head Lettuce.

Test ID (City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing[b]	Vol (L/ha)	g ai/ha	RTI[c] (days)	Total Rate (g ai/ha)	
TK0056884-02 (Oviedo, Florida, USA, 2011)	A15929B	Foliar broadcast/ 34 leaves	276-285	150	5	450	D-W Surfactant Plus 0.2% v/v
		Foliar broadcast/ 28 leaves		150	5		
		Foliar broadcast/ 38 leaves		150	--		
	A16971B	Foliar broadcast/ 34 leaves	276-285	150	5	450	D-W Surfactant Plus 0.2% v/v
		Foliar broadcast/ 28 leaves		150	5		
		Foliar broadcast/ 38 leaves		150	--		
	A15929B	Foliar broadcast/ 34 leaves	276-285	150	5	450	D-W Surfactant Plus 0.2% v/v
		Foliar broadcast/ 28 leaves		150	5		
		Foliar broadcast/ 38 leaves		150	--		
	A16971B	Foliar broadcast/ 34 leaves	276-285	150	5	450	D-W Surfactant Plus 0.2% v/v
		Foliar broadcast/ 28 leaves		150	5		
		Foliar broadcast/ 38 leaves		150	--		
	A15929B	Foliar broadcast/ 34 leaves	276-285	150	5	450	D-W Surfactant Plus 0.2% v/v
		Foliar broadcast/ 28 leaves		150	5		
		Foliar broadcast/ 38 leaves		150	--		
	A16971B	Foliar broadcast/ 34 leaves	276-285	150	5	450	D-W Surfactant Plus 0.2% v/v
		Foliar broadcast/ 28 leaves		150	5		
		Foliar broadcast/ 38 leaves		150	--		

Table 2: Study Use Pattern for Head Lettuce.

Test ID (City, State/ Region, Country, Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing[b]	Vol (L/ha)	g ai/ha	RTI[c] (days)	Total Rate (g ai/ha)	
TK0056884-03 (King City, California, USA, 2011)	A15929B	Foliar broadcast/ 11 DBH	281-293	150	5	450	Pro 90 0.5% v/v
		Foliar broadcast/ 6 DBH		150	5		
		Foliar broadcast/ 1 DBH		150	--		
	A16971B	Foliar broadcast/ 11 DBH	281-293	150	5	450	Pro 90 0.5% v/v
		Foliar broadcast/ 6 DBH		150	5		
		Foliar broadcast/ 1 DBH		150	--		
	A15929B	Foliar broadcast/ 11 DBH	281-293	150	5	450	Pro 90 0.5% v/v
		Foliar broadcast/ 6 DBH		150	5		
		Foliar broadcast/ 1 DBH		150	--		
	A16971B	Foliar broadcast/ 11 DBH	281-293	150	5	450	Pro 90 0.5% v/v
		Foliar broadcast/ 6 DBH		150	5		
		Foliar broadcast/ 1 DBH		150	--		
	A15929B	Foliar broadcast/ 11 DBH	281-293	150	5	450	Pro 90 0.5% v/v
		Foliar broadcast/ 6 DBH		150	5		
		Foliar broadcast/ 1 DBH		150	--		
	A16971B	Foliar broadcast/ 11 DBH	281-293	150	5	450	Pro 90 0.5% v/v
		Foliar broadcast/ 6 DBH		150	5		
		Foliar broadcast/ 1 DBH		150	--		

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.
[b] DBH = Days before harvest
[c] Retreatment Interval

II. Results and Discussion

The analytical method is described in Table 3. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on head lettuce. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 5.0 ppm in/on head lettuce were 111 and 106% for cyantraniliprole, respectively; 104-116% and 99-110% for its metabolites, respectively as per Table 4. The chromatograms of control samples of head lettuce are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27749) supports the storage durations/conditions of samples in the head lettuce side-by-side formulation bridging field trials reported in Table 5. No corrections to residues due to in-storage dissipation are necessary.
Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the head lettuce side-by-side formulation bridging field trials with cyantraniliprole (100 OD and 40 WG) are reported in Table 6. A summary of residue data with both formulations is presented in Table 7.

The maximum residue values of cyantraniliprole in/on head lettuce for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 1.55 ppm, and 1.96 ppm, respectively. Residue values for all metabolites (IN-J9Z38, IN-N7B69, IN-JCZ38, IN-MYX98, IN-MLA84, and IN-K7H19) were less than the LOQ (0.01 ppm) for both the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG). Residue decline data were not submitted with the study. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 3: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Head lettuce samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Genogrinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One ml of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: Phenomenex Synergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSySystems/MDS Sciex API 5000 mass spectrometer (MS/MS)
LOQ	0.010 mg/kg

Table 4: Summary of Concurrent Recoveries of Cyantraniliprole from Head Lettuce.

Matrix	Spiking level in ppm (mg/kg)	Sample size (n)	Recoveries (%)	Mean ± SDEV (%)
Cyantraniliprole				
Head Lettuce	0.01	1	111	NA
	5.0	1	106	NA
IN-N7B69				
Head Lettuce	0.01	1	116	NA
	5.0	1	110	NA
IN-JCZ38				
Head Lettuce	0.01	1	114	NA
	5.0	1	105	NA
IN-MYX98				
Head Lettuce	0.01	1	113	NA
	5.0	1	103	NA
IN-MLA84				
Head Lettuce	0.01	1	110	NA
	5.0	1	99	NA
IN-J9Z38				
Head Lettuce	0.01	1	109	NA
	5.0	1	102	NA
IN-K7H19				
Head Lettuce	0.01	1	104	NA
	5.0	1	108	NA

Table 5. Summary of Storage Conditions for Head Lettuce.

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)
TK0056884-01 GA/2011	Control	Head Lettuce	-20±10	2.6
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			
TK0056884-02 FL/2011	Control	Head Lettuce	-20±10	8.9
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			
TK0056884-03 CA/2011	Control	Head Lettuce	-20±10	8.7
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			

Table 6: Cyantraniliprole Residue Results for Head Lettuce.

Test ID (City, State/Region, Country, Year)	EP[a]	Crop/ Variety	Total Rate (g ai/ha)	DAA /PHI[b] (days)	Residues (ppm)[c]						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
TK0056884 -01 GA/2011	None	Head Lettuce/ Bonnies Hybrid Iceberg	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	1.39	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	1.38	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	1.36	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	1.19	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	1.29	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	1.61	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TK0056884 -02 FL/2011	None	Head Lettuce/ Great Lakes	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.62	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	1.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	1.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	1.49	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	1.55	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	1.96	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TK0056884 -03 CA/2011	None	Head Lettuce/ Hallmark	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.81	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.31	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.62	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.35	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.89	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.50	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

[b] DAA = Days After Application (indicates nominal number of days between last application and sampling). Application timings and PHI timings may vary. The values presented are nominal timings.

[c] Control specimens were collected and analyzed. No residues above the limit of detection (LOQ) were observed.

Table 7. Summary of Residue Bridging Trial Data in/on Head Lettuce.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n[1]	Min.	Max.	HAFT*	Median	Mean	Std. Dev.
Cyantraniliprole									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	0.62	1.55	1.35	1.09	1.07	0.35
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	0.31	1.96	1.49	1.19	1.09	0.59
IN-J9Z38									
Head Lettuce /Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Head Lettuce/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Head Lettuce/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] n = number of plot samples, with 3 plots at each of 3 trial sites.

III. CONCLUSION

Application of a DuPont® oil dispersion (OD) formulation and from a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications of 450 g ai/ha//season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on head lettuce at 1.1±0.4 ppm, and 1.1±0.6 ppm, respectively. Residues of the metabolites (IN-J9Z38, IN-N7B69, IN-JCZ38, IN-MYX98, IN-MLA84, and IN-K7H19) were each at or less than LOQ (0.01 ppm), regardless of the formulation applied.

IIIA 7.6.1.2: USA Bell Pepper Formulation Bridging Trials

Report	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Bell Pepper from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations – USA 2011
Author	Johanna Mazlo
Report No.	TK0056884
Document No.	PMRA No. 2200373 MRID No. 48758906
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials in/on bell pepper during the 2011 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 150 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 201-291 L/ha for a maximum seasonal rate of 450 g ai/ha/season. Samples were collected at the normal commercial harvest date of 1 day. A non-ionic surfactant was added to the spray mixture according to the label recommendation of the adjuvant. The number of trials and the geographical locations are given in Table 8. The study use pattern is given in Table 9.

Table 8: Trial Locations for Bell Peppers.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
Syngenta TK0056889, TK0056889-01	2	Athens, Georgia, USA, 2011	Bridging MOR	field
Syngenta TK0056889, TK0056889-02	3	Oviedo, Florida, USA, 2011	Bridging MOR	field
Syngenta TK0056889, TK0056889-03	10	Sanger, California, USA, 2011	Bridging MOR	field

Table 9: Study Use Pattern for Bell Peppers.

Test ID (City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056889-01(Athens, Georgia, USA, 2011)	A15929B	Foliar broadcast/ BBCH 77-78	205-209	150	5	450	Peptoil 0.99% v/v
		Foliar broadcast/ BBCH 78		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A16971B	Foliar broadcast/ BBCH 77-78	201-205	150	5	450	Peptoil 0.99% v/v
		Foliar broadcast/ BBCH 78		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A15929B	Foliar broadcast/ BBCH 77-78	205-209	150	5	450	Peptoil 0.99% v/v
		Foliar broadcast/ BBCH 78		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A16971B	Foliar broadcast/ BBCH 77-78	201-205	150	5	450	Peptoil 0.99% v/v
		Foliar broadcast/ BBCH 78		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A15929B	Foliar broadcast/ BBCH 77-78	205-209	150	5	450	Peptoil 0.99% v/v
		Foliar broadcast/ BBCH 78		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A16971B	Foliar broadcast/ BBCH 77-78	201-205	150	5	450	Peptoil 0.99% v/v
		Foliar broadcast/ BBCH 78		150	5		
		Foliar broadcast/ BBCH 79		150	--		

Table 9: Study Use Pattern for Bell Peppers.

Test ID (City, State/Region, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056889-02 (Oviedo, Florida, USA, 2011)	A15929B	Foliar broadcast/ BBCH 69	284-291	150	5	450	Crossfire 0.75% v/v
		Foliar broadcast/ BBCH 72		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A16971B	Foliar broadcast/ BBCH 69	278-285	150	5	450	Crossfire 0.75% v/v
		Foliar broadcast/ BBCH 72		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A15929B	Foliar broadcast/ BBCH 69	284-291	150	5	450	Crossfire 0.75% v/v
		Foliar broadcast/ BBCH 72		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A16971B	Foliar broadcast/ BBCH 69	278-285	150	5	450	Crossfire 0.75% v/v
		Foliar broadcast/ BBCH 72		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A15929B	Foliar broadcast/ BBCH 69	284-291	150	5	450	Crossfire 0.75% v/v
		Foliar broadcast/ BBCH 72		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A16971B	Foliar broadcast/ BBCH 69	278-285	150	5	450	Crossfire 0.75% v/v
		Foliar broadcast/ BBCH 72		150	5		
		Foliar broadcast/ BBCH 79		150	--		

Table 9: Study Use Pattern for Bell Peppers.

Test ID (City, State/ Region, Country, Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056889-03 (Sanger, California, USA, 2011)	A15929B	Foliar broadcast/ BBCH 86	190-199	150	5	450	Agridex 0.12% v/v
		Foliar broadcast/ BBCH 88		150	5		
		Foliar broadcast/ BBCH 89		150	--		
	A16971B	Foliar broadcast/ BBCH 86	186-197	150	5	450	Agridex 0.12% v/v
		Foliar broadcast/ BBCH 88		150	5		
		Foliar broadcast/ BBCH 89		150	--		
	A15929B	Foliar broadcast/ BBCH 86	190-199	150	5	450	Agridex 0.12% v/v
		Foliar broadcast/ BBCH 88		150	5		
		Foliar broadcast/ BBCH 89		150	--		
	A16971B	Foliar broadcast/ BBCH 86	186-197	150	5	450	Agridex 0.12% v/v
		Foliar broadcast/ BBCH 88		150	5		
		Foliar broadcast/ BBCH 89		150	--		
	A15929B	Foliar broadcast/ BBCH 86	190-199	150	5	450	Agridex 0.12% v/v
		Foliar broadcast/ BBCH 88		150	5		
		Foliar broadcast/ BBCH 89		150	--		
	A16971B	Foliar broadcast/ BBCH 86	186-197	150	5	450	Agridex 0.12% v/v
		Foliar broadcast/ BBCH 88		150	5		
		Foliar broadcast/ BBCH 89		150	--		

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.
[b] Retreatment Interval

II. Results and Discussion

The analytical method is described in Table 10. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on bell peppers. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on bell peppers were 89 and 83% for cyantraniliprole, respectively; 75-97% and 79-95% for its metabolites, respectively as per Table 11. The chromatograms of control samples of bell peppers are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27749) supports the storage durations/conditions of samples in the bell pepper side-by-side formulation bridging field trials reported in Table 12. No corrections to residues due to in-storage dissipation are necessary. Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the bell pepper side-by-side formulation bridging field trials with cyantraniliprole (100 OD and 40 WG) are reported in Table 13. A summary of residue data with both formulations is presented in Table 14.

The maximum residue values of cyantraniliprole in/on bell peppers for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 0.44 ppm, and 0.43 ppm, respectively. Residue values for all metabolites (IN-J9Z38, IN-N7B69, IN-JCZ38, IN-MYX98, IN-MLA84, and IN-K7H19) were less than the LOQ (0.01 ppm) for both the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG). Residue decline data were not submitted with the study. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 10: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Bell pepper samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Genogrinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One ml of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: Phenomenex Synergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSySystems/MDS Sciex API 5000 mass spectrometer (MS/MS)
LOQ	0.010 mg/kg

Table 11: Summary of Concurrent Recoveries of Cyantraniliprole from Bell Pepper.

Matrix	Spiking level in ppm (mg/kg)	Sample size (n)	Recoveries (%)	Mean ± SDEV (%)
Cyantraniliprole				
Bell Pepper	0.01	2	91, 86	88.5
	1.0	2	82, 83	82.5
IN-N7B69				
Bell Pepper	0.01	2	76, 74	75
	1.0	2	79, 78	78.5
IN-JCZ38				
Bell Pepper	0.01	2	94, 96	95
	1.0	2	90, 93	91.5
IN-MYX98				
Bell Pepper	0.01	2	105, 89	97
	1.0	2	102, 88	95
IN-MLA84				
Bell Pepper	0.01	2	90, 77	83.5
	1.0	2	96, 92	94
IN-J9Z38				
Bell Pepper	0.01	2	89, 85	87
	1.0	2	89, 89	89
IN-K7H19				
Bell Pepper	0.01	2	90, 102	96
	1.0	2	90, 87	88.5

Table 12. Summary of Storage Conditions for Bell Pepper.

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)
TK0056889-01 GA/2011	Control	Bell Pepper	-20±10	3.6
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			
TK0056889-02 FL/2011	Control	Bell Pepper	-20±10	6.3
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			
TK0056889-03 CA/2011	Control	Bell Pepper	-20±10	2.9
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			

Table 13: Cyantraniliprole Residue Results for Bell Pepper.

Test ID (City, State/Region, Country, Year)	EP[a]	Crop/ Variety	Total Rate (g ai/ha)	DAA /PHI[b] (days)	Residues (ppm)[c]						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
TK0056889 -01 GA/2011	None	Bell Pepper (Yolo)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.22	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.14	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TK0056889 -02 FL/2011	None	Bell Pepper (PEPB 242 8302)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.31	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.29	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.32	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TK0056889 -03 CA/2011	None	Bell Pepper (Grande Rio)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.34	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	032	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.33	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.43	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.44	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.35	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

[b] DAA = Days After Application (indicates nominal number of days between last application and sampling). Application timings and PHI timings may vary. The values presented are nominal timings.

[c] Control specimens were collected and analyzed. No residues above the limit of detection (LOQ) were observed.

Table 14. Summary of Residue Bridging Trial Data in/on Bell Pepper.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n [1]	Min.	Max.	HAFT*	Median	Mean	Std. Dev.
Cyantraniliprole									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	0.09	0.44	0.37	0.31	0.26	0.12
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	0.06	0.43	0.37	0.27	0.25	0.11
IN-J9Z38									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Bell Pepper/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Bell Pepper/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] n = number of plot samples, with 3 plots at each of 3 trial sites.

IV. CONCLUSION

Application of a DuPont® oil dispersion (OD) formulation and from a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications of 450 g ai/ha//season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on bell peppers at 0.26±0.12 ppm, and 0.25±0.11 ppm, respectively. Residues of the metabolites (IN-J9Z38, IN-N7B69, IN-JCZ38, IN-MYX98, IN-MLA84, and IN-K7H19) were each at or less than LOQ (0.01 ppm), regardless of the formulation applied.

IIIA 7.6.1.3: USA Summer Squash Formulation Bridging Trials

Report	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Summer Squash from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations – USA 2011
Author	Johanna Mazlo
Report No.	TK0056887
Document No.	PMRA No. 2200371 MRID No. 48758904
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials in/on summer squash during the 2011 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 150 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 141-245 L/ha for a maximum seasonal rate of 450 g ai/ha/season. Samples were collected at the normal commercial harvest date of 1 day. A non-ionic surfactant was added to the spray mixture according to the label recommendation of the adjuvant. The number of trials and the geographical locations are given in Table 15. The study use pattern is given in Table 16.

Table 15: Trial Locations for Summer Squash.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
Syngenta TK0056887, TK0056887-01	1	Germansville, PA, USA, 2011	Bridging MOR	field
Syngenta TK0056887, TK0056887-02	2	Athens, GA, USA, 2011	Bridging MOR	field
Syngenta TK0056887, TK0056887-03	10	Madera, CA, USA, 2011	Bridging MOR	field

Table 16: Study Use Pattern for Summer Squash.

Test ID (City, State, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056887-01(Germansville, PA, USA, 2011)	A15929B	Foliar broadcast/ Flowering	232-245	150	5	450	Crop Oil Concentrate 0.5%v/v
		Foliar broadcast/ Bloom		150	5		
		Foliar broadcast/ Fruit developing		150	--		
	A16971B	Foliar broadcast/ Flowering	232-245	150	5	450	Crop Oil Concentrate 0.5%v/v
		Foliar broadcast/ Bloom		150	5		
		Foliar broadcast/ Fruit developing		150	--		
	A15929B	Foliar broadcast/ Flowering	232-245	150	5	450	Crop Oil Concentrate 0.5%v/v
		Foliar broadcast/ Bloom		150	5		
		Foliar broadcast/ Fruit developing		150	--		
	A16971B	Foliar broadcast/ Flowering	232-245	150	5	450	Crop Oil Concentrate 0.5%v/v
		Foliar broadcast/ Bloom		150	5		
		Foliar broadcast/ Fruit developing		150	--		
	A15929B	Foliar broadcast/ Flowering	232-245	150	5	450	Crop Oil Concentrate 0.5%v/v
		Foliar broadcast/ Bloom		150	5		
		Foliar broadcast/ Fruit developing		150	--		
	A16971B	Foliar broadcast/ Flowering	232-245	150	5	450	Crop Oil Concentrate 0.5%v/v
		Foliar broadcast/ Bloom		150	5		
		Foliar broadcast/ Fruit developing		150	--		

Table 16: Study Use Pattern for Summer Squash.

Test ID (City, State, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056887-02 (Athens, GA, USA, 2011)	A15929B	Foliar broadcast/ BBCH 72	141-178	150	5	450	Peptoil 1.0% v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 78		150	--		
	A16971B	Foliar broadcast/ BBCH 72	141-178	150	5	450	Peptoil 1.0% v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 78		150	--		
	A15929B	Foliar broadcast/ BBCH 72	141-178	150	5	450	Peptoil 1.0% v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 78		150	--		
	A16971B	Foliar broadcast/ BBCH 72	141-178	150	5	450	Peptoil 1.0% v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 78		150	--		
	A15929B	Foliar broadcast/ BBCH 72	141-178	150	5	450	Peptoil 1.0% v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 78		150	--		
	A16971B	Foliar broadcast/ BBCH 72	141-178	150	5	450	Peptoil 1.0% v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 78		150	--		

Table 16: Study Use Pattern for Summer Squash.

Test ID (City, State, Country, Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056887-03 (Madera, CA, USA, 2011)	A15929B	Foliar broadcast/ BBCH 77	232-245	150	5	450	Britz O/S blend 0.14% v/v
		Foliar broadcast/ BBCH 85		150	5		
		Foliar broadcast/ BBCH 77		150	--		
	A16971B	Foliar broadcast/ BBCH 77	232-245	150	5	450	Britz O/S blend 0.14% v/v
		Foliar broadcast/ BBCH 85		150	5		
		Foliar broadcast/ BBCH 77		150	--		
	A15929B	Foliar broadcast/ BBCH 77	232-245	150	5	450	Britz O/S blend 0.14% v/v
		Foliar broadcast/ BBCH 85		150	5		
		Foliar broadcast/ BBCH 77		150	--		
	A16971B	Foliar broadcast/ BBCH 77	232-245	150	5	450	Britz O/S blend 0.14% v/v
		Foliar broadcast/ BBCH 85		150	5		
		Foliar broadcast/ BBCH 77		150	--		
	A15929B	Foliar broadcast/ BBCH 77	232-245	150	5	450	Britz O/S blend 0.14% v/v
		Foliar broadcast/ BBCH 85		150	5		
		Foliar broadcast/ BBCH 77		150	--		
	A16971B	Foliar broadcast/ BBCH 77	232-245	150	5	450	Britz O/S blend 0.14% v/v
		Foliar broadcast/ BBCH 85		150	5		
		Foliar broadcast/ BBCH 77		150	--		

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.
[b] Retreatment Interval

II. Results and Discussion

The analytical method is described in Table 17. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on summer squash. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on summer squash were 94 and 90% for cyantraniliprole, respectively; 66-98% and 75-99% for its metabolites, respectively as per Table 18. The chromatograms of control samples of summer squash are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27749) supports the storage durations/conditions of samples in the summer squash side-by-side formulation bridging field trials reported in Table 19. No corrections to residues due to in-storage dissipation are necessary.
Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the summer squash side-by-side formulation bridging field trials with cyantraniliprole (100 OD and 40 WG) are reported in Table 20. A summary of residue data with both formulations is presented in Table 21.

The maximum residue values of cyantraniliprole in/on summer squash for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 0.11 ppm, and 0.16 ppm, respectively. Residue values for all metabolites (IN-J9Z38, IN-N7B69, IN-JCZ38, IN-MYX98, IN-MLA84, and IN-K7H19) were less than the LOQ (0.01 ppm) for both the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG). Residue decline data were not submitted with the study. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 17: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Summer squash samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Genogrinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One ml of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: Phenomenex Synergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSySystems/MDS Sciex API 5000 mass spectrometer (MS/MS)
LOQ	0.010 mg/kg

Table 18: Summary of Concurrent Recoveries of Cyantraniliprole from Summer Squash.

Matrix	Spiking level in ppm (mg/kg)	Sample size (n)	Recoveries (%)	Mean ± SDEV (%)
Cyantraniliprole				
Summer squash	0.01	3	92, 93, 98	94±3
	1.0	2	92, 88	90
IN-N7B69				
Summer squash	0.01	2	66, 66	66
	1.0	2	76, 74	75
IN-JCZ38				
Summer squash	0.01	2	87, 89	88
	1.0	2	94, 90	92
IN-MYX98				
Summer squash	0.01	2	92, 103	98
	1.0	2	98, 91	95
IN-MLA84				
Summer squash	0.01	2	88, 90	90
	1.0	2	97, 95	96
IN-J9Z38				
Summer squash	0.01	2	93, 97	95
	1.0	2	101, 96	99
IN-K7H19				
Summer squash	0.01	2	87, 86	87
	1.0	2	87, 84	86

Table 19. Summary of Storage Conditions for Summer squash.

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)
TK0056887-01 PA/2011	Control	Summer squash	-20±10	44-6.5
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			
TK0056887-02 GA/2011	Control	Summer squash	-20±10	4.7
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			
TK0056887-03 CA/2011	Control	Summer squash	-20±10	5.1
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			

Table 20: Cyantraniliprole Residue Results for Summer Squash.

Test ID (City, State, Country, Year)	EP[a]	Crop/ Variety	Total Rate (g ai/ha)	PHI[b] (days)	Residues (ppm)[c]						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
TK0056887-01 PA/2011	None	Summer squash (Super Pik)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.02, 0.04, 0.03 (avg 0.03)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.03, 0.04 (avg 0.04)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TK0056887-02 GA/2011	None	Summer squash (Early prolific straight-neck)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TK0056887-03 CA/2011	None	Summer squash (Zucchini Black Beauty)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.16	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

[b] PHI = Pre-harvest intervals expressed in days.

[c] Control specimens were collected and analyzed. No residues above the limit of detection (LOQ) were observed.

Table 21. Summary of Residue Bridging Trial Data in/on Summer Squash.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n [1]	Min.	Max.	HAFT	Median	Mean	Std. Dev.
Cyantraniliprole									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	0.02	0.11	0.09	0.04	0.06	0.03
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	0.03	0.16	0.13	0.05	0.07	0.04
IN-J9Z38									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Summer squash/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

Summer squash/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] n = number of plot samples, with 3 plots at each of 3 trial sites.

V. CONCLUSION

Application of a DuPont® oil dispersion (OD) formulation and from a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications of 450 g ai/ha//season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on summer squash at 0.06±0.03 ppm, and 0.07±0.04 ppm, respectively. Residues of the metabolites (IN-J9Z38, IN-N7B69, IN-JCZ38, IN-MYX98, IN-MLA84, and IN-K7H19) were each at or less than LOQ (0.01 ppm), regardless of the formulation applied.

IIIA 7.6.1.4: USA Cucumber Formulation Bridging Trials

Report	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Cucumber from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations – USA 2011
Author	Johanna Mazlo
Report No.	TK0056887
Document No.	PMRA No. 2200370 MRID No. 48758903
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials in/on cucumbers during the 2011 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 150 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 170-313 L/ha for a maximum seasonal rate of 450 g ai/ha/season. Samples were collected at the normal commercial harvest date of 1 day. A non-ionic surfactant was added to the spray mixture according to the label recommendation of the adjuvant. The number of trials and the geographical locations are given in Table 22. The study use pattern is given in Table 23.

Table 22: Trial Locations for Cucumbers.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
Syngenta TK0056886, TK0056886-01	2	Athens, GA, USA, 2011	Bridging MOR	field
Syngenta TK0056886, TK0056886-02	5	Fitchburg, WI, USA, 2011	Bridging MOR	field
Syngenta TK0056886, TK0056886-03	10	Madera, CA, USA, 2011	Bridging MOR	field

Table 23: Study Use Pattern for Cucumbers.

Test ID (City, State, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056886-01(Athens, GA, USA, 2011)	A15929B	Foliar broadcast/ BBCH 73	170-177	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 89		150	--		
	A16971B	Foliar broadcast/ BBCH 73	170-177	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 89		150	--		
	A15929B	Foliar broadcast/ BBCH 73	170-177	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 89		150	--		
	A16971B	Foliar broadcast/ BBCH 73	170-177	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 89		150	--		
	A15929B	Foliar broadcast/ BBCH 73	170-177	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 89		150	--		
	A16971B	Foliar broadcast/ BBCH 73	170-177	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 75		150	5		
		Foliar broadcast/ BBCH 89		150	--		

Table 23: Study Use Pattern for Cucumbers.

Test ID (City, State, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056886-02 (Fitchburg, WI, USA, 2011)	A15929B	Foliar broadcast/ BBCH 41-49	303-313	150	5	450	Preference 0.12% v/v
		Foliar broadcast/ BBCH 65-77		150	5		
		Foliar broadcast/ BBCH 65-79		150	--		
	A16971B	Foliar broadcast/ BBCH 41-49	303-313	150	5	450	Preference 0.12% v/v
		Foliar broadcast/ BBCH 65-77		150	5		
		Foliar broadcast/ BBCH 65-79		150	--		
	A15929B	Foliar broadcast/ BBCH 41-49	303-313	150	5	450	Preference 0.12% v/v
		Foliar broadcast/ BBCH 65-77		150	5		
		Foliar broadcast/ BBCH 65-79		150	--		
	A16971B	Foliar broadcast/ BBCH 41-49	303-313	150	5	450	Preference 0.12% v/v
		Foliar broadcast/ BBCH 65-77		150	5		
		Foliar broadcast/ BBCH 65-79		150	--		
	A15929B	Foliar broadcast/ BBCH 41-49	303-313	150	5	450	Preference 0.12% v/v
		Foliar broadcast/ BBCH 65-77		150	5		
		Foliar broadcast/ BBCH 65-79		150	--		
	A16971B	Foliar broadcast/ BBCH 41-49	303-313	150	5	450	Preference 0.12% v/v
		Foliar broadcast/ BBCH 65-77		150	5		
		Foliar broadcast/ BBCH 65-79		150	--		

Table 23: Study Use Pattern for Cucumbers.

Test ID (City, State, Country, Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056886-03 (Madera, CA, USA, 2011)	A15929B	Foliar broadcast/ BBCH 77	234-237	150	5	450	R-11 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		
	A16971B	Foliar broadcast/ BBCH 77	234-237	150	5	450	R-11 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		
	A15929B	Foliar broadcast/ BBCH 77	234-237	150	5	450	R-11 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		
	A16971B	Foliar broadcast/ BBCH 77	234-237	150	5	450	R-11 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		
	A15929B	Foliar broadcast/ BBCH 77	234-237	150	5	450	R-11 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		
	A16971B	Foliar broadcast/ BBCH 77	234-237	150	5	450	R-11 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.
[b] Retreatment Interval

II. Results and Discussion

The analytical method is described in Table 24. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on cucumbers. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on cucumber were 100 and 94% for cyantraniliprole, respectively; 97-101% and 86-100% for its metabolites, respectively as per Table 25. The chromatograms of control samples of cucumber are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27749) supports the storage durations/conditions of samples in the cucumber side-by-side formulation bridging field trials reported in Table 26. No corrections to residues due to in-storage dissipation are necessary. Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the cucumber side-by-side formulation bridging field trials with cyantraniliprole (100 OD and 40 WG) are reported in Table 27. A summary of residue data with both formulations is presented in Table 28.

The maximum residue values of cyantraniliprole in/on cucumbers for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 0.09 ppm, and 0.09 ppm, respectively. Residue values for all metabolites (IN-J9Z38, IN-N7B69, IN-JCZ38, IN-MYX98, IN-MLA84, and IN-K7H19) were less than the LOQ (0.01 ppm) for both the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG). Residue decline data were not submitted with the study. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 24: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Cucumber samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Genogrinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One ml of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: Phenomenex Synergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSySystems/MDS Sciex API 5000 mass spectrometer (MS/MS)
LOQ	0.010 mg/kg

Table 25: Summary of Concurrent Recoveries of Cyantraniliprole from Cucumber.

Matrix	Spiking level in ppm (mg/kg)	Sample size (n)	Recoveries (%)	Mean ± SDEV (%)
Cyantraniliprole				
Cucumber	0.01	3	98, 101, 101	100±1.7
	1.0	2	95, 93	94
IN-N7B69				
Cucumber	0.01	2	100, 101	101
	1.0	2	87, 85	86
IN-JCZ38				
Cucumber	0.01	2	99, 102	101
	1.0	2	100, 97	99
IN-MYX98				
Cucumber	0.01	2	97, 103	100
	1.0	2	101, 89	95
IN-MLA84				
Cucumber	0.01	2	98, 98	98
	1.0	2	97, 97	97
IN-J9Z38				
Cucumber	0.01	3	100, 97, 98	98±1.4
	1.0	2	99, 100	100
IN-K7H19				
Cucumber	0.01	2	98, 96	97
	1.0	2	95, 88	92

Table 26. Summary of Storage Conditions for Cucumbers.

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)
TK0056886-01 GA/2011	Control	Cucumber	-20±10	7.0
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			
TK0056886-02 WI/2011	Control	Cucumber	-20±10	7.0
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			
TK0056886-03 CA/2011	Control	Cucumber	-20±10	7.0
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			

Table 27: Cyantraniliprole Residue Results for Cucumbers.

Test ID (City, State, Country, Year)	EP[a]	Crop/ Variety	Total Rate (g ai/ha)	PHI[b] (days)	Residues (ppm)[c]						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
TK0056886-01 GA/2011	None	Cucumber (National Pickling)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.090	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.060	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.081	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.086	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.071	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.060	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TK0056886-02 WI/2011	None	Cucumber (Eureka F1)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.067	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.052	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.091	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.078	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.085	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.084	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TK0056886-03 CA/2011	None	Cucumber (Poinsett 76)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.052	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.041	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.043	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.0260, 0.0258, 0.0268 (avg 0.026)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.0182, 0.0193, 0.0201 (avg 0.019_	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.0654, 0.0704, 0.0739 (avg 0.070)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

[b] PHI = Pre-harvest intervals expressed in days.

[c] Control specimens were collected and analyzed. No residues above the limit of detection (LOQ) were observed.

Table 28. Summary of Residue Bridging Trial Data in/on Cucumbers.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n [1]	Min.	Max.	HAFT	Median	Mean	Std. Dev.
Cyantraniliprole									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	0.02	0.09	0.08	0.07	0.06	0.03
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	0.03	0.09	0.07	0.06	0.06	0.02
IN-J9Z38									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Cucumber/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cucumber/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] n = number of plot samples, with 3 plots at each of 3 trial sites.

VI. CONCLUSION

Application of a DuPont® oil dispersion (OD) formulation and from a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications of 450 g ai/ha//season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on cucumbers at 0.06±0.03 ppm, and 0.06±0.02 ppm, respectively. Residues of the metabolites (IN-J9Z38, IN-N7B69, IN-JCZ38, IN-MYX98, IN-MLA84, and IN-K7H19) were each at or less than LOQ (0.01 ppm), regardless of the formulation applied.

IIIA 7.6.1.5 USA Tomato Formulation Bridging Trials

Report	Cyantraniliprole (A15929B and A16971B) – Magnitude of the Residues in or on Tomato from Side-by-Side Bridging Trials to Compare: Cyantraniliprole 100OD and Cyantraniliprole 40WG Formulations – USA 2011
Author	Johanna Mazlo
Report No.	TK0056887
Document No.	PMRA No. 2200372 MRID No. 48758905
Guidelines	EPA Residue Chemistry Test Guidelines, OPPTS 860.1500 PMRA Residue Chemistry Guidelines, DIR98-02: Section 9
Sponsor	Syngenta Crop Protection, LLC
GLP	Yes
Acceptability	Study is scientifically acceptable

I. STUDY DESIGN

Syngenta conducted three crop field trials in/on tomatoes during the 2011 growing season in the United States with a side-by-side comparison of the two formulation types: DuPont® oil dispersion (100 OD- A15929B) and Syngenta water dispersible granules (40 WG- A16971B). Three foliar applications were made each at 150 g ai/ha/application with a 5-day retreatment interval (RTI) and a spray volume of 182-295 L/ha for a maximum seasonal rate of 450 g ai/ha/season. Samples were collected at the normal commercial harvest date of 1 day. A non-ionic surfactant was added to the spray mixture according to the label recommendation of the adjuvant. The number of trials and the geographical locations are given in Table 29. The study use pattern is given in Table 30.

Table 29: Trial Locations for Tomatoes.

Test No.	NAFTA Region	State/Country/Year	Test Type	Environment (field/protected)
Syngenta TK0056886, TK0056886-01	1	Germansville, PA, USA, 2011	Bridging MOR	field
Syngenta TK0056886, TK0056886-02	3	Oviedo, FL, USA, 2011	Bridging MOR	field
Syngenta TK0056886, TK0056886-03	10	Sanger, CA, USA, 2011	Bridging MOR	field

Table 30: Study Use Pattern for Tomatoes.

Test ID (City, State, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056888-01(Germansville, PA, USA, 2011)	A15929B	Foliar broadcast/ BBCH 81	229-245	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 84		150	5		
		Foliar broadcast/ BBCH 88		150	--		
	A16971B	Foliar broadcast/ BBCH 81	229-245	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 84		150	5		
		Foliar broadcast/ BBCH 88		150	--		
	A15929B	Foliar broadcast/ BBCH 81	229-245	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 84		150	5		
		Foliar broadcast/ BBCH 88		150	--		
	A16971B	Foliar broadcast/ BBCH 81	229-245	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 84		150	5		
		Foliar broadcast/ BBCH 88		150	--		
	A15929B	Foliar broadcast/ BBCH 81	229-245	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 84		150	5		
		Foliar broadcast/ BBCH 88		150	--		
	A16971B	Foliar broadcast/ BBCH 81	229-245	150	5	450	Induce 0.12%v/v
		Foliar broadcast/ BBCH 84		150	5		
		Foliar broadcast/ BBCH 88		150	--		

Table 30: Study Use Pattern for Tomatoes.

Test ID (City, State, Country, /Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056888-02 (Oviedo, FL, USA, 2011)	A15929B	Foliar broadcast/ BBCH 72	267-295	150	5	450	DW Surfactant Plus 0.14% v/v
		Foliar broadcast/ BBCH 74		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A16971B	Foliar broadcast/ BBCH 72	267-295	150	5	450	DW Surfactant Plus 0.14% v/v
		Foliar broadcast/ BBCH 74		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A15929B	Foliar broadcast/ BBCH 72	267-295	150	5	450	DW Surfactant Plus 0.14% v/v
		Foliar broadcast/ BBCH 74		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A16971B	Foliar broadcast/ BBCH 72	267-295	150	5	450	DW Surfactant Plus 0.14% v/v
		Foliar broadcast/ BBCH 74		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A15929B	Foliar broadcast/ BBCH 72	267-295	150	5	450	DW Surfactant Plus 0.14% v/v
		Foliar broadcast/ BBCH 74		150	5		
		Foliar broadcast/ BBCH 79		150	--		
	A16971B	Foliar broadcast/ BBCH 72	267-295	150	5	450	DW Surfactant Plus 0.14% v/v
		Foliar broadcast/ BBCH 74		150	5		
		Foliar broadcast/ BBCH 79		150	--		

Table 30: Study Use Pattern for Tomatoes.

Test ID (City, State, Country, Year)	EP[a]	Application					Tank Mix Adjuvants
		Method/Timing	Vol (L/ha)	g ai/ha	RTI[b] (days)	Total Rate (g ai/ha)	
TK0056888-03 (Sanger, CA, USA, 2011)	A15929B	Foliar broadcast/ BBCH 77	182-197	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		
	A16971B	Foliar broadcast/ BBCH 77	182-197	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		
	A15929B	Foliar broadcast/ BBCH 77	182-197	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		
	A16971B	Foliar broadcast/ BBCH 77	182-197	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		
	A15929B	Foliar broadcast/ BBCH 77	182-197	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		
	A16971B	Foliar broadcast/ BBCH 77	182-197	150	5	450	Induce 0.12% v/v
		Foliar broadcast/ BBCH 77		150	5		
		Foliar broadcast/ BBCH 85		150	--		

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.
[b] Retreatment Interval

II. Results and Discussion

The analytical method is described in Table 31. DuPont Method 15736, LC-MS/MS, was suitable to quantitate residues of cyantraniliprole and the metabolites (IN-N7B69, INJCZ38, IN-MYX98, IN-MLA84, IN-J9Z38, and IN-K7H19) in/on tomatoes. The procedural recoveries reported from spiking at levels of 0.01 ppm (i.e. method LOQ) and 1.0 ppm in/on cucumber were 103 and 114% for cyantraniliprole, respectively; 89-108% and 99-115% for its metabolites, respectively as per Table 32. The chromatograms of control samples of tomatoes are free from interferences. Recovery values were not corrected for control residues, since no residues were detected at levels greater than the LOQ of 0.01 ppm in any control sample.

The storage stability study (refer to Document M-II Section 4 in DuPont - 27749) supports the storage durations/conditions of samples in the tomato side-by-side formulation bridging field trials reported in Table 33. No corrections to residues due to in-storage dissipation are necessary. Deviations to the protocol, specific to the field or analytical phase of the study were documented, and were not expected to adversely affect the integrity of the data. Residue data from the tomato side-by-side formulation bridging field trials with cyantraniliprole (100 OD and 40 WG) are reported in Table 34. A summary of residue data with both formulations is presented in Table 35.

The maximum residue values of cyantraniliprole in/on tomatoes for the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG) were 0.21 ppm, and 0.27 ppm, respectively. Residue values for all metabolites (IN-J9Z38, IN-N7B69, IN-JCZ38, IN-MYX98, IN-MLA84, and IN-K7H19) were less than the LOQ (0.01 ppm) for both the DuPont oil dispersion formulation (100 OD) and the Syngenta water dispersible granule formulation (40 WG). Residue decline data were not submitted with the study. The actual temperature recordings and average rainfall were generally within average historical values for the residue study period. Irrigation was used to supplement as needed.

Table 31: Analytical Methodology.

Method ID	DuPont® Method, DuPont-15736 "Analytical Method for the Determination of DPX-HGW86 and Metabolites in Crops Using LC/MS/MS"
Analyte(s)	Cyantraniliprole (DPX-HGW86) and six metabolites (IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N7B69)
Extraction Solvent/Technique	Tomato samples were extracted twice with acetonitrile:water (90:10, v/v). Steel balls were added to pulverize plant material. Extracts were then shaken on a Genogrinder for 2 minutes. The volume was brought to 50 mL with acetonitrile:water (90:10, v/v). One ml of sample extract was mixed with methanol and water; and an aliquot of the mixture was filtered through a 0.2 µm PTFE filter and placed into an autosampler vial.
Cleanup Strategies	None
Chromatography	UPLC: Phenomenex Synergi Polar RP, 50 mm × 3.0 mm i.d., 2.5 µm particle size
Detection	Water ACQUITY ultra performance liquid chromatography system equipped with an Applied BioSySystems/MDS Sciex API 5000 mass spectrometer (MS/MS)
LOQ	0.010 mg/kg

Table 32: Summary of Concurrent Recoveries of Cyantraniliprole from Tomatoes.

Matrix	Spiking level in ppm (mg/kg)	Sample size (n)	Recoveries (%)	Mean ± SDEV (%)
Cyantraniliprole				
Tomato	0.01	2	105, 100	103
	1.0	1	114	114
IN-N7B69				
Tomato	0.01	2	74, 103	89
	1.0	1	101	101
IN-JCZ38				
Tomato	0.01	2	100, 87	94
	1.0	1	109	109
IN-MYX98				
Tomato	0.01	2	100, 98	99
	1.0	1	101	101
IN-MLA84				
Tomato	0.01	2	90, 100	95
	1.0	1	105	105
IN-J9Z38				
Tomato	0.01	2	112, 103	108
	1.0	1	115	115
IN-K7H19				
Tomato	0.01	2	100, 102	101
	1.0	1	99	99

Table 33. Summary of Storage Conditions for Tomatoes.

Trial ID No.	Treatment	RAC	Storage Temperature (°C)	Maximum Storage Interval (month)
TK0056888-01 PA/2011	Control	Tomato	-20±10	3.5
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			
TK0056888-02 FL/2011	Control	Tomato	-20±10	6.3
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			
TK0056888-03 CA/2011	Control	Tomato	-20±10	3.2
	Cyantraniliprole 100 OD			
	Cyantraniliprole 40 WG			

Table 34: Cyantraniliprole Residue Results for Tomatoes.

Test ID (City, State, Country, Year)	EP[a]	Crop/ Variety	Total Rate (g ai/ha)	PHI[b] (days)	Residues (ppm)[c]						
					DPX-HGW86	IN-N7B69	IN-JCZ38	IN-MYX98	IN-MLA84	IN-J9Z38	IN-K7H19
TK0056888-01 PA/2011	None	Tomato (Mountain Spring)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.14	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TK0056888-02 FL/2011	None	Tomato (Better Boy)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TK0056888-03 CA/2011	None	Tomato (Shasta)	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.20	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.23	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A15929B		450	1	0.21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	A16971B		450	1	0.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

[a] EP = End-use Product; A15929B (Cyantraniliprole 100 OD) is an oil dispersion concentrate that contains 101 g/L; A16971B (Cyantraniliprole 40 WG) is a wettable granular concentration that contains 40 % w/w active ingredient.

[b] PHI = Pre-harvest intervals expressed in days.

[c] Control specimens were collected and analyzed. No residues above the limit of detection (LOQ) were observed.

Table 35. Summary of Residue Bridging Trial Data in/on Tomatoes.

Commodity/ method/EP[1]	Total Applic. Rate (g ai/ha)	PHI (days)	Residue Levels (ppm)						
			n [1]	Min.	Max.	HAFT	Median	Mean	Std. Dev.
Cyantraniliprole									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	0.06	0.21	0.18	0.11	0.13	0.05
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	0.06	0.27	0.23	0.12	0.14	0.08
IN-J9Z38									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-JCZ38									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-K7H19									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MLA84									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-MYX98									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
IN-N7B69									
Tomatoes/Foliar (A15929B- 100 OD)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--
Tomatoes/Foliar (A16971B- 40 WG)	450	1	9	<0.01	<0.01	<0.01	<0.01	<0.01	--

[1] n = number of plot samples, with 3 plots at each of 3 trial sites.

VII. CONCLUSION

Application of a DuPont® oil dispersion (OD) formulation and from a Syngenta water dispersible granule (WG) formulation in side-by-side plots as three foliar applications of 450 g ai/ha//season with a pre-harvest interval (PHI) of 1 day resulted in average residues of cyantraniliprole in or on tomatoes at 0.13±0.05 ppm, and 0.14±0.08 ppm, respectively. Residues of the metabolites (IN-J9Z38, IN-N7B69, IN-JCZ38, IN-MYX98, IN-MLA84, and IN-K7H19) were each at or less than LOQ (0.01 ppm), regardless of the formulation applied.