

US EPA ARCHIVE DOCUMENT

BAS 510 F
Cucurbit Vegetable Crop Group
PMRA a.i. code (CCH)

Magnitude of the Residue
OPPTS 860.1500
DACO 7.4.1

PC Code: 128008
MRID: 45623403
Submission #2001-1027, 1036,1043



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

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

MEMORANDUM

Date: July 2, 2003

Reviewers:

William Cutchin Date: 8/25/03
William Cutchin, Chemist
Reviewer
SIMB/HED (7509C)

Henri P. Bietlot Date: July 16/03
Henri P. Bietlot, Chemist
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FREAS, HED, PMRA

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Richard A. Loranger
Branch Senior Scientist
RAB2/HED (7509C)

Ariff Ally Date: July 25/03
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Section Head
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DP Barcode: D281841 and D297173

Petition No.: 1F06313

Citations: 45623403 Haughey, D.; Abdel-Baky, S. (2001) The Magnitude of BAS 510 F Residues in Cucurbits: Final Report: Lab Project Number: 2001/5002593: 66698: BAS 510 UCF. Unpublished study prepared by BASF Agro Research. 51 p.

Sponsor: BASF Corporation

Background

The information contained herein was compiled by Dynamac Corporation (20440 Century Boulevard, Suite 100, Germantown MD 20874), contractor, under the supervision of RAB2/HED. This DER has undergone secondary review by RAB2, and reflects current HED and Office of Pesticide Programs (OPP) policies. This DER has also been peer-reviewed by PMRA/Canada.

Executive Summary

BASF Corporation has submitted field trial data on the representative crops, cucumber, cantaloupe, and summer squash, of the Cucurbit Vegetable Crop Group (Crop Group 9). During the 2001 growing season, six cantaloupe trials were conducted in Regions 2 (1 trial, GA), 5 (1 trial, MI), 6 (1 trial, TX), and 10 (3 trials, CA); six cucumber trials were conducted in

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Regions 2 (2 trials, GA and NC), 3 (1 trial, FL), 5 (2 trials, MI and WI), and 6 (1 trial, TX); and five summer squash trials were conducted in Regions 1 (1 trial, PA), 2 (1 trial, NC), 3 (1 trial, FL), 5 (1 trial, MI), and 10 (1 trial, CA).

Samples of cantaloupe, cucumber, and summer squash were harvested on the day (0-day PHI) of the last of four foliar spray applications of the 70% wettable granule (WG) formulation at ~0.3 lb ai/A/application (0.336 kg ai/ha/application), with a 6- to 8-day retreatment interval, for a total rate of 1.2-1.23 lb ai/A (1.3-1.4 kg ai/ha). Applications were made using ground equipment in a spray volume of 19.9-40.11 gal/A (223-449 l/ha) of water with a spray adjuvant added.

A residue decline study was not conducted on a representative crop of the cucurbit vegetable group to determine whether residues increase or decrease with longer post-treatment intervals. However, since residue decline studies with the 70% wettable granule (WG) formulation have been performed on several other crop groups (e.g., tree fruit, root crop, leafy vegetable, and fruiting vegetable) and indicate residues do not increase with longer PHIs, a residue decline study is not required on cucurbits.

Residues of BAS 510 F ranged 0.22-1.48 ppm, <0.05-0.16 ppm, and 0.10-1.08 ppm, respectively, in/on treated samples of cantaloupe, cucumber, and summer squash harvested at the 0-day PHI.

Residues were quantitated using LC/MS/MS method D9908, the data collection method for plant commodities. Acceptable concurrent method validation data for cantaloupe, cucumber, and summer squash were included in the submission.

Maximum storage intervals of crop samples from harvest-to-analysis were 95 days (3.1 months) for cantaloupe, 111 days (3.7 months) for cucumber, and 121 days (4.0 months) for summer squash. Adequate storage stability data (refer to the DER for MRID 45405109) are available to support the storage conditions and intervals of samples from the submitted cantaloupe, cucumber, and summer squash field trials.

The number and location of field trials are adequate to satisfy EPA's requirements with respect to residue data for the cucurbit vegetables crop group. However, because the maximum residue in cucumbers is >5x lower than in the other representative crops (cantaloupe, summer squash), a tolerance covering the entire crop group is not appropriate. The data do support a tolerance for the "Cucurbit Vegetables (Crop Group 9), excluding cucumber". A separate tolerance on cucumbers is supported, provided two additional field trials on cucumbers (one each from Regions 2 and 10) are submitted as a **condition of registration**.

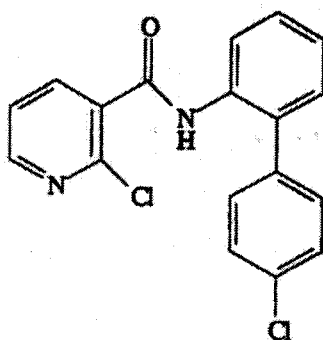
For Canada the following additional trials are required: for cantaloupe, (muskmelons) one trial in each of zones 5 and 5B; for cucumber, one trial in zone 5B; and, for squash, one trial in each of zones 5 and 5B. It should be noted that these trials are needed to support both the use of this chemical on this crop group but also to support the residue levels resulting in rotated crops from the use of this chemical in any crop.

GLP Compliance

Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. No GLP deviations were reported.

1. Materials and Methods

1.1. Test Substance



BAS 510 F

Active Ingredient

Common Name:	Nicobifen (ISO, proposed)
IUPAC Name:	2-Chloro-N-(4'-chlorobiphenyl-2-yl)nicotinamide
CAS Name:	3-Pyridinecarboxamide, 2-chloro-N-(4'chloro[1,1'-biphenyl]-2-yl)-
CAS Number:	188425-85-6
Company Name:	BAS 510 F
Other Synonyms:	BASF Registry No. 300355

TABLE B.1.2. Trial Numbers and Geographical Locations									
NAFTA Growing Region	Cantaloup (muskmelon)			Cucumber			Summer Squash		
	Submitted	Requested		Submitted	Requested		Submitted	Requested	
		Canada	US		Canada	US		Canada	US
1							1		1
0.04166667								1	
2	1		1	2		2	1		1
3				1		1	1		1
4									
5	1	2	1	2	2	2	1	2	1
0.208333333									
5B		1			2			1	
6	1		1	1		1			
7									
0.291666667									
8									
9									
10	3		3				1		1
11									
12					1			1	
13									
14									
15									
16									
17									
18									
19									
20									
21									
Total	6	3	6	6	5	6	5	5	5

The representative commodities for the cucurbit vegetable crop group are cucumber, muskmelon, and summer squash.

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Table 1.2.2. Crop and Field Trial Information.

EPA Region	Location (County, State, Year)	Crop; Variety	Formul.	Applic. Timing	Applic. Rate (lb ai/A) [kg ai/ha]	Retreat intervals (days)	No. of Applics.	Applic. Method/ Applic. Volume (GPA)	Total Applic. Rate (lb ai/A) [kg ai/ha]	Tank Mix Adjuvants	Harvest Procedures
Cantaloupe											
2	Clarke, GA, 2001	Cantaloupe; Edisto 47	70% WG	1.5" diameter green fruit	0.3 [0.336]	7	4	Foliar spray/ 27.25-30.07	1.2 [1.3]	Surf-Ac 820	Cantaloupes harvested 0 days after last application (DALA).
				3-8" diameter fruit							
				4-9" fruit							
				Maturing fruit							
5	Ottawa, MI, 2001	Cantaloupe; Star Fire	70% WG	Immature melons; up to 5" diameter	0.3 [0.336]	37413	4	Foliar spray/ 20.9-21.3	1.2 [1.3]	Latron B-1956	Cantaloupes harvested 0 DALA.
				Immature melons; up to 6" diameter							
				Immature melons; up to 7" long							
				Mature fruit; up to 8" diameter							
6	Waller, TX, 2001	Cantaloupe; Jumbo Hale's Best	70% WG	Flowering to 5" diameter fruit	0.2987-0.3009 [0.335-0.337]	7	4	Foliar spray/ 39.81-40.11	1.2012 [1.3]	Triton AG 98	Cantaloupes harvested 0 DALA.
				Blooming to 6" diameter fruit							
				2-8" fruit							
				Mature fruit							
10	Tulare, CA, 2001	Cantaloupe; Magnum PMR.45	70% WG	Fruit maturation	0.2997-0.3 [0.336]	37413	4	Foliar spray/ 30.29-30.32	1.1997 [1.3]	Latron B-1956	Cantaloupes harvested 0 DALA.
				Fruit set							
				Fruit set							
				Maturity							
10	Tulare, CA, 2001	Cantaloupe; Magnum .45	70% WG	Fruit maturation	0.2998-0.3 [0.336]	7	4	Foliar spray/ 30.2-30.41	1.1998 [1.3]	Latron B-1956	Cantaloupes harvested 0 DALA.
				Fruit set							
				Fruit set							
				Maturity							

Table 1.2.2. Crop and Field Trial Information.

EPA Region	Location (County, State, Year)	Crop; Variety	Formul.	Applic. Timing	Applic. Rate (lb ai/A) [kg ai/ha]	Retreat. Intervals (days)	No. of Applies.	Applic. Method/ Applic. Volume (GPA)	Total Applic. Rate (lb ai/A) [kg ai/ha]	Tank Mix Adjuvants	Harvest Procedures
10	Madera, CA, 2001	Cantaloupe; Top Mark	70% WG	Bloom to small fruit Small fruit Sizing melons Not reported	0.295-0.303 [0.330-0.339]	7	4	Foliar spray/ 29.47-30.34	1.2032 [1.3]	Latron B-1956	Cantaloupes harvested 0 DALA.
Cucumber											
2	Wake, NC, 2001	Cucumber; National Pickling	70% WG	Blooming Blooming/fruiting Blooming/fruiting Fruiting	0.2984-0.3086 [0.334-0.346]	7	4	Foliar spray/ 29.84-30.86	1.2104 [1.4]	X-77	Cucumbers harvested 0 DALA.
2	Clarke, GA, 2001	Cucumber; Long Green Imp	70% WG	Bloom 1-4" fruit 1-8" fruit Mature fruit; up to 10" long	0.3 [0.336]	7	4	Foliar spray/ 29-30.03	1.2 [1.3]	Surf-Ac 820	Cucumbers harvested 0 DALA.
3	Seminole, FL, 2001	Cucumber; Poinsett 76	70% WG	Flowering Flowering/small fruit Flowering/ immature fruit Mature fruit	0.2989-0.3071 [0.335-0.344]	7	4	Foliar spray/ 29.89-30.71	1.21 [1.4]	Triangle D-W Surfactant	Cucumbers harvested 0 DALA.
5	Ottawa, MI, 2001	Cucumber; Marketmore	70% WG	Full bloom with up to 2" long fruit Full bloom with up to 4" long fruit Fruit up to 7" long Mature fruit up to 8" long	0.3 [0.336]	37413	4	Foliar spray/ 20.9-21.4	1.2 [1.3]	Latron B-1956	Cucumbers harvested 0 DALA.

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Table 1.2.2. Crop and Field Trial Information.

EPA Region	Location (County, State, Year)	Crop; Variety	Formul.	Applic. Timing	Applic. Rate (lb ai/A) [kg ai/ha]	Retreat. Intervals (days)	No. of Applics.	Applic. Method/ Applic. Volume (GPA)	Total Applic. Rate (lb ai/A) [kg ai/ha]	Tank Mix Adjuvants	Harvest Procedures
5	Pepin, WI, 2001	Cucumber; Eureka Hybrid	70% WG	Early blossom	0.299-0.304 [0.335-0.340]	37413	4	Foliar spray/ 19.9-20.27	1.204 [1.3]	Class Preference	Cucumbers harvested 0 DALA.
				Blossoming							
				Fruit development, blossoming							
				Mature							
6	Waller, TX, 2001	Cucumber; Straight 8	70% WG	Early bloom	0.2992-0.3 [0.335-0.336]	7	4	Foliar spray/ 39.88-40.08	1.1984 [1.3]	Triton AG 98	Cucumbers harvested 0 DALA.
				Early fruit set							
				Blooming to 6" fruit							
				1-8" long fruit							

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Summer squash											
1	Lehigh, PA, 2001	Summer squash; Sunray	70% WG	Pre-bloom; 5-6 leaf stage	0.305-0.313 [0.342-0.351]	7	4	Foliar spray/ 20.34-20.9	1.231 [1.4]	Penetrator Plus or Induce	Squash harvested 0 DALA.
				Early fruit set							
				Fruit set 40%							
				Mature fruit							
2	Wake, NC, 2001	Summer squash; Straight Neck Early Prolific	70% WG	Early fruiting	0.299-0.302 [0.335-0.338]	37414	4	Foliar spray/ 29.9-30.21	1.2027 [1.3]	X-77	Squash harvested 0 DALA.
				Blooming, fruiting							
				Blooming, fruiting							
				Blooming, fruiting							
3	Seminole, FL, 2001	Summer squash; Yellow Summer Crookneck	70% WG	Flowering	0.301-0.3079 [0.337-0.345]	7	4	Foliar spray/ 30.1-30.79	1.2136 [1.4]	Triangle D-W Surfactant	Squash harvested 0 DALA.
				Full flowering							
				Fruiting							
				Mature squash							
5	Ottawa, MI, 2001	Summer squash; Zucchini Elite	70% WG	7-9 leaves; early bloom	0.3 [0.336]	7	4	Foliar spray/ 22.6-23.3	1.2 [1.3]	Latron B-1956	Squash harvested 0 DALA.
				Full bloom; early fruit up to 5" long							
				Full bloom; fruit up to 8" long							
				Mature fruit							

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Table I.2.2. Crop and Field Trial Information.

EPA Region	Location (County, State, Year)	Crop; Variety	Formul.	Applic. Timing	Applic. Rate (lb ai/A) [kg ai/ha]	Retreat. Intervals (days)	No. of Applies.	Applic. Method/ Applic. Volume (GPA)	Total Applic. Rate (lb ai/A) [kg ai/ha]	Tank Mix Adjuvants	Harvest Procedures
10	Madera, CA, 2001	Summer squash; Sundance	70% WG	Mature squash bloom	0.3014-	7	4	Foliar spray/ 30.14-30.5	1.2110 [1.3]	Latron B-1956	Squash harvested 0 DALA.
				Small squash	0.305						
				Mature squash	0.338-						
				Mature squash	0.342]						

1.3. Post-harvest Procedures

A single untreated and duplicate treated samples of cantaloupe, cucumber, and summer squash were harvested from each field trial on the day of the last application. Specific harvesting procedures were not described; however, each sample consisted of at least 12 fruits. Samples were bagged and stored frozen (temperature not specified) on the day of harvest. Samples were shipped frozen within 0-23 days of harvest to BASF Agro Research (Research Triangle Park, NC) for analysis. Cantaloupe, cucumber, and summer squash samples were analyzed within 4 days of extraction.

Matrix	RAC or Extract	Storage Temperature (°C) (Analytical Laboratory)	Duration
Cantaloupe	Fruit (RAC)	<-10	56-95 days (1.8-3.1 months)
Cucumber	Fruit (RAC)		55-111 days (1.8-3.7 months)
Summer squash	Fruit (RAC)		84-121 days (2.8-4.0 months)

1.4. Analytical Methods

Samples of cantaloupe, cucumber, and summer squash were analyzed for residues of BAS 510 F using LC/MS/MS method D9908, the data collection method for plants. Briefly, samples were extracted with methanol:water:2N HCl (70:25:5, v:v:v). An aliquot of the extract was subjected to liquid/liquid partitioning with saturated sodium chloride and cyclohexane. An aliquot of the cyclohexane phase was collected, evaporated to dryness, and residues were redissolved in methanol:4 mM ammonium formate and formic acid buffer solution (8:2, v:v) for analysis by LC/MS/MS. Refer to the DER for MRID 45405027 for a complete description of the quantitation procedures. The limit of detection (LOD) was 0.025 ppm, and the validated limit of quantitation (LOQ) was 0.05 ppm for the residues of BAS 510 F in/on cantaloupe, cucumber, and summer squash.

2. Results

Crop Matrix	Fortification Level (ppm)	Recoveries (%)	Mean Recovery ± SD
Cantaloupe	0.05, 1.0	89, 109, 128	109 ± 20
Cucumber	0.05, 1.0	90, 92	91
Summer squash	0.05, 1.0	94, 98, 102, 120	104 ± 11

Table 2.2. Residue Data from Crop Field Trials in Cucurbit Vegetables with BAS 510 F.						
Location (County, State, Year)	Crop Variety	Commodity	Formul.	Total Rate (lbs ai/A) [kg ai/ha]	PHI (days)	BAS 510 F residues (ppm)
Cantaloupe						
Clarke, GA, 2001	Cantaloupe; Edisto 47	Fruit	70% WG	1.20 [1.3]	0	0.27, 0.31
Ottawa, MI, 2001	Cantaloupe; Star Fire	Fruit	70% WG	1.20 [1.3]	0	0.50, 0.61
Waller, TX, 2001	Cantaloupe; Jumbo Hale's Best	Fruit	70% WG	1.20 [1.3]	0	0.22, 0.23
Tulare, CA, 2001	Cantaloupe; Magnum PMR.45	Fruit	70% WG	1.20 [1.3]	0	1.06 ¹ , 1.48 ¹
Tulare, CA, 2001	Cantaloupe; Magnum .45	Fruit	70% WG	1.20 [1.3]	0	0.35, 0.42
Madera, CA, 2001	Cantaloupe; Top Mark	Fruit	70% WG	1.20 [1.3]	0	0.67, 0.74
Cucumber						
Wake, NC, 2001	Cucumber; National Pickling	Fruit	70% WG	1.21 [1.4]	0	0.11, 0.16
Clarke, GA, 2001	Cucumber; Long Green Imp	Fruit	70% WG	1.2 [1.3]	0	0.11, 0.16
Seminole, FL, 2001	Cucumber; Poinsett 76	Fruit	70% WG	1.21 [1.4]	0	0.12, 0.14
Ottawa, MI, 2001	Cucumber; Marketmore	Fruit	70% WG	1.2 [1.3]	0	<0.05, 0.08
Pepin, WI, 2001	Cucumber; Eureka Hybrid	Fruit	70% WG	1.20 [1.3]	0	<0.05, 0.05
Waller, TX, 2001	Cucumber; Straight 8	Fruit	70% WG	1.20 [1.3]	0	0.07, 0.07
Summer squash						
Lehigh, PA, 2001	Summer squash; Sunray	Fruit	70% WG	1.23 [1.4]	0	0.10, 0.13
Wake, NC, 2001	Summer squash; Straight Neck Early Prolific	Fruit	70% WG	1.20 [1.3]	0	0.12, 0.15
Seminole, FL, 2001	Summer squash; Yellow Summer Crookneck	Fruit	70% WG	1.21 [1.4]	0	0.12, 0.19
Ottawa, MI, 2001	Summer squash; Zucchini Elite	Fruit	70% WG	1.21 [1.3]	0	0.14, 0.64 ¹
Madera, CA, 2001	Summer squash; Sundance	Fruit	70% WG	1.21 [1.3]	0	0.87, 1.08 ¹

¹ The highest residue value of duplicate or triplicate analyses is reported.

Table 2.3. Summary of Residue Data from Crop Field Trials in Cucurbit Vegetables with BAS 510 F.

Commodity	Total Applic. Rate (lb ai/A)	PHI (days)	Residue Levels (ppm)				
			Minimum	Maximum	HAFT	Mean [median]	Std. Dev.
Cantaloupe	1.2	0	0.22	1.48	1.27	0.57 [0.46]	0.38
Cucumber	1.2-1.21	0	<0.05	0.16	0.14	0.10 [0.10]	0.04
Summer squash	1.2-1.23	0	0.1	1.08	0.98	0.35 [0.17]	0.37

3. Discussion

3.1. Methods

In studies conducted in 2001, cantaloupe, cucumber, and summer squash were harvested on the day (0-day PHI) of the last of four foliar spray applications of the 70% WG formulation at ~0.3 lb ai/A/application (=0.336 kg ai/ha/application), with a 6- to 8-day retreatment interval, for a total rate of 1.2-1.23 lb ai/A (1.3-1.4 kg ai/ha). Applications were made using ground equipment in a spray volume of 19.9-40.11 gal/A (223-449 l/ha) of water with a spray adjuvant added.

Six cantaloupe trials were conducted in Regions 2 (1 trial, GA), 5 (1 trial, MI), 6 (1 trial, TX), and 10 (3 trials, CA); six cucumber trials were conducted in Regions 2 (2 trials, GA and NC), 3 (1 trial, FL), 5 (2 trials, MI and WI), and 6 (1 trial, TX); and five summer squash trials were conducted in Regions 1 (1 trial, PA), 2 (1 trial, NC), 3 (1 trial, FL), 5 (1 trial, MI), and 10 (1 trial, CA).

Residues of BAS 510 F in/on cantaloupe, cucumber, and summer squash were quantitated using LC/MS/MS method D9908, the data collection method for plant commodities. Acceptable concurrent method validation data for cantaloupe, cucumber, and summer squash were included in the submission. Storage stability data (refer to the DER for MRID 45405109) are available to support the storage conditions and intervals of 95 days (3.1 months) for cantaloupe, 111 days (3.7 months) for cucumber, and 121 days (4.0 months) for summer squash.

3.2. Results

In cantaloupe, residues of BAS 510 F were 0.22-1.48 ppm in/on samples harvested 0 days following the last of four foliar spray applications of the 70% WG formulation at 0.299-0.303 lb ai/A/application (0.334-0.339 kg ai/ha/application), for a total rate of 1.2 lb ai/A (1.3 kg ai/ha). Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on six samples of untreated cantaloupe.

In cucumber, residues of BAS 510 F were <0.05-0.16 ppm in/on samples harvested 0 days following the last of four foliar spray applications of the 70% WG formulation at 0.298-0.309 lb

ai/A/application (0.334-0.346 kg ai/ha/application), for a total rate of 1.2-1.21 lb ai/A (1.3-1.4 kg ai/ha). Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on six samples of untreated cucumbers.

In summer squash, residues of BAS 510 F were 0.10-1.08 ppm in/on samples harvested 0 days following the last of four foliar spray applications of the 70% WG formulation at 0.299-0.313 lb ai/A/application (0.335-0.350 kg ai/ha/application), for a total rate of 1.2-1.23 lb ai/A (1.3-1.4 kg ai/ha). Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on five samples of untreated summer squash.

Residue decline studies were not conducted for any of the representative crops of the cucurbit vegetables crop group. However, since residue decline studies with the 70% wettable granule (WG) formulation have been performed on several other crop groups (e.g., tree fruit, root crop, leafy vegetable, and fruiting vegetable) and indicate residues do not increase with longer PHIs, a residue decline study is not required on cucurbits.

The number and location of field trials are adequate to satisfy EPA's requirements with respect to residue data for the cucurbit vegetables crop group. However, because the maximum residue in cucumbers is >5x lower than in the other representative crops (cantaloupe, summer squash), a tolerance covering the entire crop group is not appropriate. The data do support a tolerance for the "Cucurbit Vegetables (Crop Group 9), excluding cucumber". A separate tolerance on cucumbers is supported, provided two additional field trials on cucumbers (one each from Regions 2 and 10) are submitted as a **condition of registration**.

Registration of BAS 510F for use on cucurbit crops within Canada will be contingent upon submission of the following additional trials: for cantaloupe, (muskmelons) one trial in each of zones 5 and 5B; for cucumber, one trial in zone 5B; and, for squash, one trial in each of zones 5 and 5B.

4. Deficiencies

Two additional field trials are required to meet the data requirements for a separate tolerance on cucumbers. These additional studies may be submitted as a **condition of registration**.

In Canada, additional trials in cantaloupe, (muskmelons) (one trial in each of zones 5 and 5B); in cucumber, (one trial in zone 5B); and, in squash, (one trial in each of zones 5 and 5B) are required.

5. References

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45672101 Wofford, J.; et al (2002) A Summary of Weather Conditions for BAS 510 F Field Residue Studies Conducted from 1999-2001 Data: BASF Registration Document Number: 2002/5002878. Unpublished study prepared by BASF Agro Research. 24 p.