

US EPA ARCHIVE DOCUMENT

BAS 510 F
Cabbage, Radish, and Wheat
PMRA a.i. code (CCH)

Field Accumulation in Rotational Crops
OPPTS 860.1900
DACO 7.4.4

PC Code: 128008
MRID: 45405203
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:

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[Signature] Date: July 16/03
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DP Barcode: D278386

Petition No.: 1F06313

Citation: 45405203 Haughey, D.; Abdel-Baky, S. (2001) Limited Rotational Crop Study for the Use of BAS 510 F: Final Report: Lab Project Number: 46697: 2001/5000966. Unpublished study prepared by BASF Corporation. 88 p.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 was also peer-reviewed by PMRA.

Executive Summary

Two field trials were conducted, one each in Region 2 (GA) and Region 10 (CA). Five foliar applications of the 70% WG formulation were made to the primary crop (strawberries), with 6- to 8-day retreatment intervals, at ~0.37 lb ai/A/application (0.41 kg ai/ha/application) for a total application rate of 1.85-1.87 lb ai/A (2.07-2.09 kg ai/ha). Strawberries were harvested at normal maturity, and representative rotational crops (cabbage, radish, and winter wheat) were planted 14,

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30, and 45 days following the last application to the primary crop. Samples of the rotational crop commodities (cabbage heads with and without wrapper leaves, radish roots and tops, and winter wheat forage, hay, straw, and grain) were harvested at normal maturity and frozen (-10 C) until analysis.

The frozen storage interval from harvest-to-analysis was 116-380 days (3.8-12.5 months). Adequate storage stability data (refer to the DER for MRID 45405109) are available to support the storage conditions and intervals of samples from this limited field rotational crop study.

Samples were analyzed for residues of BAS 510 F using LC/MS/MS method D9908, the data collection method for plant commodities. Adequate concurrent method validation data were included in the submission.

In rotational crops planted 14 days following the last application, residues of BAS 510 F were <0.05 ppm in/on cabbage heads with and without wrapper leaves, 0.25-0.82 ppm in/on radish tops, 0.07-0.32 ppm in/on radish roots, 0.18-0.34 ppm in/on wheat forage, 0.24-1.7 ppm in/on wheat hay, 0.97-3.2 ppm in/on wheat straw, and <0.05-0.05 ppm in/on wheat grain.

In rotational crops planted 30 days following the last application, residues of BAS 510 F were 0.08-0.41 ppm in/on radish tops, <0.05-0.15 ppm in/on radish roots, 0.16-0.39 ppm in/on wheat forage, 0.22-1.3 ppm in/on wheat hay, and 0.70-2.5 ppm in/on wheat straw. Cabbage and wheat grain samples from this plant-back interval (PBI) and the 45-day PBI were not analyzed because residues were \leq 0.05 ppm at the 14-day PBI.

In rotational crops planted 45 days following the last application, residues of BAS 510 F were 0.20-0.55 ppm in/on radish tops, 0.11-0.20 ppm in/on radish roots, 0.24-0.31 ppm in/on wheat forage, 0.24-1.1 ppm in/on wheat hay, and 0.53-2.4 ppm in/on wheat straw.

The submitted study is acceptable as a limited field rotational crop study. **Because quantifiable residues of BAS 510 F were observed in radish tops and roots, and wheat forage, hay, and straw at the longest (45 -day) plantback interval studied, extensive rotational crop field trials are required to support the establishment of indirect residue tolerances for rotational crop commodities.**

GLP Compliance

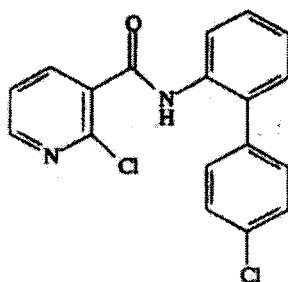
Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. No deviations from regulatory requirements were cited.

1. Materials and Methods

1.1. Test Substance

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
Structure:



BAS 510 F

1.2. Trial Information

Cabbage, Radish, and Wheat	Growing Region													Total Number of Trials
	1	2	3	4	5	6	7	8	9	10	11	12	13	
Submitted	-	3	-	-	-	-	-	-	-	3	-	-	-	6
Requested	-	-	-	-	-	-	-	-	-	-	-	-	-	6 ¹

Two field trials for each rotated crop are required for a limited rotational crop study; location regions are not specified (OPPTS 860.1900) and Dir 98-02.

Location (County, State, Year)	EPA Region	Crop; Variety	Formulation	Applic. Rate (lb ai/A) [kg ai/ha]	Tank Mix Adjuvants	Harvest Procedures
Unspecified county, CA; 1999	10	Strawberry; Irvine	70% WG	5 x 0.37 = 1.85 [2.07]	Latron B-1956 (2 pt/A or 2 pt/100 gal)	Harvested at normal maturity; harvesting procedures not specified
Tift, GA; 1999	2	Strawberry; Sweet Charlies	70% WG	5 x 0.37-0.38 = 1.87 [2.09]	Latron B-1956 (12 oz/100 gal)	Harvested at normal maturity; harvesting procedures not specified

Note: The soil at the trial sites was fine sandy loam and loamy sand. Information was provided pertaining to soil composition, pH, CEC, OM and bulk density; no unusual characteristics were reported.

Five foliar applications of the 70% WG formulation were made to the primary crop (strawberries) at two field sites (CA and GA), with 6- to 8-day retreatment intervals, at ~0.37 lb ai/A/application (0.41 kg ai/ha/application), for a total application rate of 1.85-1.87 lb ai/A (2.07-2.09 kg ai/ha). Applications were made in 20-44 gal/A (224-493 l/ha) of water using ground equipment, with a non-silicone spray adjuvant added to the spray. The petitioner noted that in the CA trial, the spray adjuvant was applied at 5-12x the rate specified on the label for the adjuvant. Strawberries were harvested at normal maturity (within approximately 1 day of final application), and the rotational crops cabbage, radish, and winter wheat were planted 14, 30, and 45 days following the last application to the primary crop.

A single untreated and duplicate treated samples of the rotational crops from the 14-, 30-, and 45-day plant-back intervals (PBIs) were collected at normal maturity. Mature cabbage heads, with and without wrapper leaves, were harvested 90-166 days after planting (DAP). Mature radishes were harvested 34-118 DAP and separated into roots and tops. Immature wheat forage (6-8 inches tall) was harvested 81-118 DAP, mature wheat hay (between the early flower or boot stage and the soft dough stage) was harvested 138-172 DAP, and mature wheat straw and grain were harvested 178-212 DAP. Sampling procedures were not specified, but minimum sample weights were 2.2 lb for wheat forage and grain, 1.1 lb (1 kg) for wheat hay and straw, and 4.4 lb (2 kg) for radishes; cabbage samples consisted of at least 12 heads.

1.3. Post-harvest Procedures

Samples were frozen (temperature not specified) on the day of harvest and were shipped frozen to BASF (Research Triangle Park, NC) for analysis. Samples were held in frozen storage (-10C) for 116-380 days, and were analyzed within 11 days of extraction. Adequate frozen storage stability data on diverse crops are available to support these storage intervals; see the DER for MRID 45405109.

Matrix	RAC or Extract	Storage Temperature (°C)	Duration
Cabbage	With and without wrapper leaves	<-10 C	143-320 days (4.7-10.5 months)
Radish	Tops	<-10 C	191-380 days (6.3-12.5 months)
	Roots	<-10 C	190-380 days (6.2-12.5 months)
Wheat	Forage	<-10 C	199-266 days (6.5-8.7 months)
	Hay	<-10 C	134-197 days (4.4-6.5 months)
	Straw	<-10 C	116-155 days (3.8-5.1 months)
	Grain	<-10 C	116-134 days (3.8-4.4 months)

1.4. Analytical Methods

Samples of rotational crop commodities 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:HCl (70:25:5, v:v:v) and filtered. An aliquot of the filtrate was cleaned-up using liquid:liquid partitioning with saturated NaCl and cyclohexane. An aliquot of the cyclohexane phase was evaporated to dryness, and residues were redissolved in ammonium formate:formic acid 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 residues of BAS 510 F in/on all rotated crop commodities. Concurrent recoveries obtained from the different matrices are presented in Table 2.1 below.

2. Results

Crop Matrix	Fortification Level (ppm)	Recoveries (%)	Mean Recovery ± SD
Cabbage (with and without wrapper leaves)	0.05	85, 86, 92, 104	89 ± 7
	1.0	81, 85, 88, 90	
Radish tops	0.05	83, 87, 88, 92, 94, 96, 100, 104	92 ± 8
	1.0	80, 87, 89, 92, 105	
Radish roots	0.05	79, 80, 88, 88, 88, 90, 116, 118	93 ± 15
	1.0	82, 83, 86, 92, 121	
Wheat forage	0.05	82, 83, 84, 84, 90, 93	92 ± 12
	1.0	85, 110, 113	
Wheat hay	0.05	72, 74, 86, 92, 96, 98	87 ± 10
	1.0	77, 87, 91, 101	

Table 2.1. Summary of Concurrent Analytical Method Validation.

Crop Matrix	Fortification Level (ppm)	Recoveries (%)	Mean Recovery \pm SD
Wheat straw	0.05	90, 94, 98, 98, 99	94 \pm 6
	1.0	82, 93, 101	
Wheat grain	0.05	85, 86	84 \pm 2
	1.0	82	

Table 2.2. Residue Data from Rotational Crop Trials with BAS 510 F, 70% WG formulation, Foliarly Applied to the Primary Crop (Strawberry) at 1.85-1.87 lb ai/A (2.07-2.09 kg ai/ha).

Location (County, State, Year)	Crop; Variety	Commodity	Plant-Back Interval (days)	BAS 510 F Residues (ppm)
Unspecified county, CA; 1999	Cabbage; Copenhagen MKT	Head with wrapper leaves	14	<0.05, <0.05
			30	Not analyzed (N/A)
			45	N/A
		Head without wrapper leaves	14	<0.05, <0.05
			30	N/A
			45	N/A
Unspecified county, CA; 1999	Radish; White Icicle	Tops	14	0.250, 0.290
			30	0.379, 0.406
			45	0.432, 0.550
		Roots	14	0.070, 0.110
			30	0.120, 0.146
			45	0.135, 0.197
Unspecified county, CA; 1999	Wheat; Yecora Rojo	Forage	14	0.180, 0.240
			30	0.379, 0.393
			45	0.307, 0.307
		Hay	14	1.370, 1.680
			30	0.708, 1.275
			45	0.842, 1.099
		Straw	14	2.500, 3.180
			30	2.327, 2.536
			45	2.363, 2.418
		Grain	14	<0.05, 0.050
			30	N/A
			45	N/A

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Location (County, State, Year)	Crop; Variety	Commodity	Plant-Back Interval (days)	BAS 510 F Residues (ppm)
Tift, GA; 1999	Cabbage; Bravo	Head with wrapper leaves	14	<0.05, <0.05
			30	N/A
			45	N/A
		Head without wrapper leaves	14	<0.05, <0.05
			30	N/A
			45	N/A
Tift, GA; 1999	Radish; White Icicle	Tops	14	0.720, 0.820
			30	0.078, 0.150
			45	0.195, 0.226
		Roots	14	0.270, 0.320
			30	<0.05, <0.05
			45	0.107, 0.120
Tift, GA; 1999	Wheat; Pioneer 2684	Forage	14	0.330, 0.340
			30	0.156, 0.202
			45	0.240, 0.256
		Hay	14	0.24, 0.25
			30	0.209, 0.233
			45	0.239, 0.242
		Straw	14	0.97, 2.43
			30	0.695, 0.725
			45	0.533, 0.694
		Grain	14	<0.05, <0.05
			30	N/A
			45	N/A

Table 2.3. Summary of Residue Data from Rotational Crop Trials with BAS 510 F Applied to the Primary Crop.

Commodity	Total Applic. Rate (lb ai/A) [kg ai/ha]	Plant-Back Interval (days)	Residue Levels (ppm)			
			Maximum	HAFT	Mean	Std. Dev.
Cabbage (with wrapper leaves)	1.85-1.87 [2.07-2.09]	14	<0.05	<0.05	<0.05	--
Cabbage (without wrapper leaves)	1.85-1.87 [2.07-2.09]	14	<0.05	<0.05	<0.05	--
Radish tops	1.85-1.87 [2.07-2.09]	14	0.820	0.770	0.520	0.29
		30	0.406	0.393	0.253	0.16
		45	0.550	0.491	0.351	0.17
Radish roots	1.85-1.87 [2.07-2.09]	14	0.320	0.295	0.193	0.12
		30	0.146	0.133	0.092	0.05
		45	0.197	0.166	0.140	0.04
Wheat forage	1.85-1.87 [2.07-2.09]	14	0.340	0.335	0.273	0.08
		30	0.393	0.386	0.283	0.12
		45	0.307	0.307	0.278	0.03
Wheat hay	1.85-1.87 [2.07-2.09]	14	1.68	1.53	0.885	0.75
		30	1.28	0.992	0.606	0.50
		45	1.10	0.971	0.606	0.43
Wheat straw	1.85-1.87 [2.07-2.09]	14	3.18	2.84	2.27	0.93
		30	2.54	2.43	1.57	1.00
		45	2.42	2.39	1.50	1.03
Wheat grain	1.85-1.87 [2.07-2.09]	14	0.05	<0.05	<0.05	--

Apparent residues in all untreated samples of cabbage (with and without wrapper leaves), radish tops and roots, and wheat forage, hay, straw, and grain were below the method LOQ (<0.05 ppm), except in one untreated sample each of radish tops (0.088 ppm), radish roots (0.09-0.13 ppm from replicate analyses), and wheat hay (0.06 ppm), and two samples of untreated wheat forage (0.031 and 0.032 ppm).

3. Discussion

3.1. Methods

Two field trials were conducted, one in Region 2 (GA) and one in Region 10 (CA). Five foliar applications of the 70% WG formulation were made to the primary crop (strawberries), with 6- to 8-day retreatment intervals, at ~0.37 lb ai/A/application (0.41 kg ai/ha/application), for a total application rate of 1.85-1.87 lb ai/A (2.07-2.09 kg ai/ha). Applications were made using ground equipment in 20-44 gal/A (224-493 l/ha) of water with a non-silicone spray adjuvant added to the spray. Strawberries were harvested at normal maturity (PHI not specified), and representative rotational crops (cabbage, radish, and winter wheat) were planted 14, 30, and 45 days following the last treatment to the primary crop strawberries at each of the two sites. Rainfall on the rotational crops was reported as below normal at both sites. Temperatures were normal at the CA site and above normal at the GA site. Both sites received sprinkler irrigation.

Rotational crop samples--cabbage heads with and without wrapper leaves, radish roots and tops, and wheat forage (immature), hay, straw, and grain were harvested at normal maturity and held in frozen storage for up to 380 days prior to extraction and analysis for residues of BAS 510 F using LC/MS/MS Method D9908; concurrent method recovery data included in this submission indicate that the LC/MS/MS method is adequate for data collection. Adequate storage stability data (refer to the DER for MRID 45405109) are available to support the storage conditions and intervals of samples from this limited field rotational crop study.

3.2. Results

In rotational crops planted 14 days following the last application, residues of BAS 510 F were <0.05 ppm in/on cabbage heads with and without wrapper leaves, 0.25-0.82 ppm in/on radish tops, 0.07-0.32 ppm in/on radish roots, 0.18-0.34 ppm in/on wheat forage, 0.24-1.68 ppm in/on wheat hay, 0.97-3.18 ppm in/on wheat straw, and <0.05-0.05 ppm in/on wheat grain.

In rotational crops planted 30 days following the last application, residues of BAS 510 F were 0.078-0.406 ppm in/on radish tops, <0.05-0.146 ppm in/on radish roots, 0.156-0.393 ppm in/on wheat forage, 0.209-1.275 ppm in/on wheat hay, and 0.695-2.536 ppm in/on wheat straw. Cabbage and wheat grain samples from this plant-back interval (PBI) and the 45-day PBI were not analyzed because residues were ≤0.05 ppm at the 14-day PBI.

In rotational crops planted 45 days following the last application, residues of BAS 510 F were 0.195-0.55 ppm in/on radish tops, 0.107-0.197 ppm in/on radish roots, 0.24-0.307 ppm in/on wheat forage, 0.239-1.099 ppm in/on wheat hay, and 0.533-2.418 ppm in/on wheat straw.

Because quantifiable residues of BAS 510 F were observed in radish tops and roots, and wheat forage, hay, and straw at the longest (45 -day) plantback interval studied, extensive rotational crop field trials are required to establish indirect residue tolerances for rotational crop commodities.

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4. Deficiencies

None.

5. References

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.