

US EPA ARCHIVE DOCUMENT

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

Magnitude of the Residue
OPPTS 860.1500
DACO 7.4.1

PC Code: 128008
MRID: 45405118
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:

M.J. Nelson Date: 9-2-03
Maxie Jo Nelson, Chemist
Reviewer
RAB2/HED (7509C)

R. Loranger Date: 8/15/03
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RAB2/HED (7509C)

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[Signature] Date: July 25/03
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FREAS, HED, PMRA

DP Barcode: D278386

Petition No.: PP#1F06313

Citation: 45405118 Versoi, P.; Abdel-Baky, S. (2000) The Magnitude of BAS 510 F Residues in Red Raspberries and Highbush Blueberries: Final Report: Lab Project Number: 2000/5195: 63912: 99277/NY/1. Unpublished study prepared by BASF Corporation. 53 p.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

BASF Corporation has submitted field trial data on the representative crops (highbush blueberry and red raspberry) of the berry crop group (crop group 13). Six blueberry trials were conducted in Regions 1 (1 trial; NY), 2 (2 trials; GA), 5 (2 trials; WI), and 12 (1 trial; OR) and three raspberry trials were conducted in Regions 1 (1 trial; NY) and 12 (2 trials; OR). The number and

location of field trials satisfy the US EPA's data requirements with respect to the geographic representation of residue data for the berries crop group.

For both high bush and low bush blueberries, the PMRA's data requirements have not been met. Additional trials in both zones 1A (3 trials) and 5A (3 trials) are required by the PMRA to support a national registration for blueberries. The PMRA can, however, support a registration for high bush blue berries with the data provided. For raspberries, additional trials (one additional in each of zones 5 and 5B) will be required as a condition of registration in Canada.

At each test location, the 70% WG formulation of BAS 510 F was applied four times as a foliar spray at ~0.37 lb ai/A/application, (0.414 ka ai/ha/application) with a 6- to 9-day retreatment interval, for a total rate of 1.48-1.52 lb ai/A (1.66-1.70 kg ai/ha/season). Mature samples were collected at a 0-day post-treatment interval. In one raspberry field trial, additional samples were collected at 2, 4, 6, and 8 days following treatment to evaluate residue decline.

Residues of BAS 510 F in/on blueberries and raspberries were quantitated using a validated LC/MS/MS method (D9908), the data collection method for plant commodities. Storage stability data (refer to the DER for MRID 45405109) are available to support the 96 days storage interval for the samples from the submitted berry field trials.

At the applied total rate of 1.48-1.52 lb ai/A (1.66-1.70 kg ai/ha/season), the ranges of BAS 510F residues in/on treated mature samples were 0.49-2.50 ppm for blueberries and 1.39-3.31 ppm for raspberries. The residue decline data generated in New York State for raspberries indicated that residues of BAS 510 F decreased at longer post-treatment intervals with a half-life of approximately 8 days and complete dissipation anticipated by 15 days.

Residue data from the current submission are acceptable to fulfill the US EPA's crop field trial data requirements by this use pattern for the berry crop group (crop group 13). Sufficient data are available for the PMRA to support a registration on high bush blueberries and a registration on the remaining crops within this crop group, provided additional residue trials in raspberries (one trial in each of zones 5 and 5A) are carried out and submitted as a condition of registration.

GLP Compliance

Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. No GLP deviations were reported which would impact the study results or their interpretation.

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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

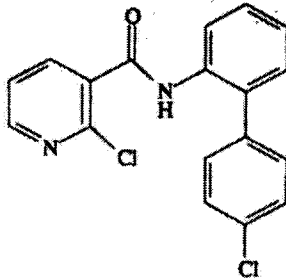
CAS Name: 3-Pyridinecarboxamide, 2-chloro-N-(4'chloro[1,1'-biphenyl]-2-yl)-

CAS Number: 188425-85-6

Company Name: BAS 510 F

Other Synonyms: BASF Registry No. 300355

Structure:



BAS 510 F

| TABLE B.1.2. Trial Numbers and Geographical Locations | | | | | | | | |
|---|-----------------------------|-----|-----|------------------|-------------|-----|-----|-----|
| NAFTA Growing Region | Raspberry, red ¹ | | | | Blueberries | | | |
| | Canada | | US | | Canada | | US | |
| | SUB | REQ | SUB | REQ ² | SUB | REQ | SUB | REQ |
| 1 | 1 | | 1 | | 1 | 1 | 1 | 1 |
| 1A | | | | | | 3 | | |
| 2 | | | | | 2 | | 2 | 2 |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | 1 | | | 2 | | 2 | 2 |
| 5A | | | | | | 3 | | |
| 5B | | 1 | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 7A | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | 2 | 3 | 2 | | | 1 | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| Total | 3 | 5 | 3 | N/A | 5 | 8 | 5 | 5 |

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¹ The representative commodities for berries crop group are any one blackberry or any one raspberry and highbush blueberry.

² OPPTS 860.1500 Table 5 does not identify specific regions for the reduced number of raspberry field trials required as a representative crop of the berries crop group. However, trials were conducted for raspberries in Regions 1 and 12, which together account for 82% of raspberry production (OPPTS 860.1500, Table 6).

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) [l/ha] | Total Applic. Rate (lb ai/A) [kg ai/ha] | Tank Mix Adjuvants | Harvest Procedures |
|----------------------------|--------------------------------|--|---------|---|-----------------------------------|---------------------------|-----------------|---|---|------------------------------|---|
| Blueberry, highbush | | | | | | | | | | | |
| 1 | Yates, NY, 1999 | Highbush blueberry, Blue Ray and Blue Crop | 70% WG | Verasion (coloration) early maturity early maturity mature berries | 0.37-0.39 [0.414-0.437] | 6-7 | 4 | Foliar spray/ 60.3-62.6 [675-701] | 1.52 [1.70] | Activate Plus (0.0025%, v:v) | Berries harvested 0 days after last application (DALA). |
| 2 | Tift, GA, 1999 | Highbush blueberry, Tift Blue | 70% WG | 1% ripe fruit 10% ripe fruit 30% ripe fruit 50% ripe fruit | 0.367-0.372 [0.411-0.417] | 7 | 4 | Foliar spray/ 53.3-56.8 [597-636] | 1.475 [1.652] | Latron B-1956 (1pt/100gal) | Berries harvested 0 DALA. |
| 2 | Colquitt, GA, 1999 | Highbush blueberry, Climax | 70% WG | 40% ripe fruit 70% ripe fruit 95% ripe fruit mature fruit | 0.364-0.381 [0.408-0.427] | 7 | 4 | Foliar spray/ 54.3-57.0 [608-638] | 1.498 [1.678] | Latron B-1956 (1pt/100gal) | Berries harvested 0 DALA. |
| 5 | Piencce, WI, 1999 | Highbush blueberry, Blue Chop | 70% WG | 0.25" diameter 0.5" diameter 20% ripe 85% ripe | 0.37 [0.414] | 6-7 | 4 | Foliar spray/ 49.6-50.43 [555-565] | 1.48 [1.658] | X77 (6oz/100gal) | Berries harvested 0 DALA. |
| 5 | Jackson, WI, 1999 | Highbush blueberry, Bestlay | 70% WG | 0.25" diameter 0.5" diameter | 0.37-0.383 [0.414-0.429] | 6-9 | 4 | Foliar spray/ 50.5-51.7 [566-579] | 1.513 [1.694] | X77 (6oz/100gal) | Berries harvested 0 DALA. |

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|------------|---------------------------------|-------------------------------|---------|------------------------|-----------------------------------|---------------------------|-----------------|---|---|------------------------------|---|
| 12 | Benton, OR, 1999 | Highbush blueberry, Blue Crop | 70% WG | 70% ripe | 0.375-0.379 [0.420-0.424] | 6-8 | 4 | Foliar spray/ 101.08-102.02 [1131-1142] | 1.504 [1.684] | Latron B-1956 (3oz/100gal) | Berries harvested 0 DALA. |
| | | | | 80% ripe | | | | | | | |
| | | | | 1-2 berries in cluster | | | | | | | |
| | | | | 10% ripe | | | | | | | |
| 1 | Yates, NY, 1999 (decline study) | Red raspberry, Titau | 70% WG | mature | 0.37-0.39 [0.414-0.437] | 6 | 4 | Foliar spray/ 59.7-63.1 [669-707] | 1.51 [1.69] | Activate Plus (0.0025%, v/v) | Berries harvested 0, 2, 4, 6, and 8 DALA. |
| | | | | 50% colored | | | | | | | |
| | | | | 0.625" berries | | | | | | | |
| | | | | 0.5" berries | | | | | | | |
| | | | | mature berries | | | | | | | |
| 12 | Washington, OR, 1999 | Red raspberry, Meecker | 70% WG | green, red fruit | 0.368-0.387 [0.412-0.433] | 7 | 4 | Foliar spray/ 54.85-57.72 [614-646] | 1.4996 [1.68] | Triton AG 98 (4oz/100gal) | Berries harvested 0 DALA. |
| | | | | mature fruit | | | | | | | |
| | | | | Bloom - green fruit | | | | | | | |
| | | | | Bloom - green fruit | | | | | | | |
| 12 | Washington, OR, 1999 | Red raspberry, Tulamene | 70% WG | Bloom - green fruit | 0.365-0.384 [0.409-0.431] | 7 | 4 | Foliar spray/ 54.42-57.3 [609-642] | 1.4885 [1.67] | Triton AG 98 (4oz/100gal) | Berries harvested 0 DALA. |
| | | | | mature fruit | | | | | | | |

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|------------|--------------------------------|---------------|---------|---|-----------------------------------|--------------------------|-----------------|---|---|--------------------|--------------------|
| | | | | Bloom - green fruit green, red fruit mature fruit | | | | | | | |

1.3. Post-harvest Procedures

A single untreated and duplicate treated samples of blueberries and raspberries were harvested from each field trial. Specific harvesting procedures were not described; however, each sample weighed ≥ 1.1 lbs. Additional samples of raspberries were collected from the NY trial (Yates County) at various time intervals for residue decline samples. Samples were bagged and stored frozen (temperature not specified) on the day of harvest. Samples were shipped frozen within 4-28 days of harvest to BASF Agricultural Products Center (Research Triangle Park, NC) for analysis.

| Matrix | RAC or Extract | Storage Temperature (°C) (Analytical Laboratory) | Duration |
|---------------------|----------------|---|-----------------------------|
| Blueberry, highbush | Berry | <-10 | 61-96 days (2.0-3.2 months) |
| Raspberry, red | Berry | <-10 | 70-83 days (2.3-2.7 months) |

1.4. Analytical Methods

Samples of blueberries and raspberries were analyzed for residues of BAS 510 F using LC/MS/MS method D9908, the data collection method for plant commodities. Briefly, blueberry and raspberry samples were extracted with methanol:water (70:30, v:v) and filtered. An aliquot of the filtrate was cleaned-up using C18 solid phase extraction. Residues were eluted with dichloromethane. The eluate was evaporated 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 the residues of BAS 510 F in/on blueberries and raspberries. The concurrent recoveries obtained are presented in Table 2.1.

2. Results

| Crop Matrix | Fortification Level (ppm) | Recoveries (%) | Mean Recovery |
|---------------------|---------------------------|----------------|---------------|
| Blueberry, highbush | 0.05, 5.0 | 94, 104 | 99 |
| Raspberry, red | 0.05, 5.0 | 91, 107 | 99 |

Table 2.2. Residue Data from Crop Field Trials in Berries (highbush blueberry and red raspberry) with BAS 510 F.

| Location (County, State, Year) | Crop Variety | Commodity | Formulation | Total Rate (lbs ai/A) [kg ai/ha] | PHI (days) | BAS 510 F residues (ppm) |
|------------------------------------|---------------------------|-----------|-------------|--|---------------|-----------------------------|
| Blueberry, highbush | | | | | | |
| Piencce, WI, 1999 | Blue Chop | Berry | 70% WG | 1.48 [1.66] | 0 | 0.923, 1.395 |
| Benton, OR, 1999 | Blue Crop | Berry | 70% WG | 1.50 [1.68] | 0 | 0.486, 1.194 |
| Yates, NY, 1999 | Blue Ray and Blue Crop | Berry | 70% WG | 1.52 [1.70] | 0 | 1.142, 1.402 |
| Jackson, WI, 1999 | Berkley | Berry | 70% WG | 1.51 [1.69] | 0 | 1.062, 1.460 |
| Tift, GA, 1999 | Tift Blue | Berry | 70% WG | 1.475 [1.65] | 0 | 1.393, 1.522 |
| Colquitt, GA, 1999 | Climax | Berry | 70% WG | 1.498 [1.68] | 0 | 2.171, 2.503 |
| Raspberry, red | | | | | | |
| Yates, NY, 1999 (decline study) | Titau | Berry | 70% WG | 1.51 [1.69] | 0 | 2.064, 3.308 |
| | | | | | 2 | 2.110, 2.529 |
| | | | | | 4 | 1.562, 2.288 |
| | | | | | 6 | 1.139, 2.024 |
| | | | | | 8 | 0.956, 1.525 |
| Washington, OR, 1999 | Mecker | Berry | 70% WG | 1.4996[1.68] | 0 | 1.388, 1.589 |
| Washington, OR, 1999 | Tulamene | Berry | 70% WG | 1.4885[1.68] | 0 | 1.565, 2.431 |

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

| Commodity | Total Applic. Rate (lb ai/A) [kg ai/ha] | PHI (days) | Residue Levels (ppm) | | | | |
|------------------------|--|---------------|----------------------|---------|-------|------------------|-----------|
| | | | Minimum | Maximum | HAFT | Mean (median) | Std. Dev. |
| Blueberry, highbush | 1.475-1.52 [1.65-1.70] | 0 | 0.486 | 2.503 | 2.337 | 1.388 (1.394) | 0.532 |
| Raspberry, red | 1.4885-1.51 [1.67-1.69] | 0 | 1.388 | 3.308 | 2.686 | 2.058 (1.826) | 0.723 |

3. Discussion

3.1. Methods

Blueberries and raspberries were harvested on the day (0-day PHI) of the last of four foliar spray applications of the 70% WG formulation at ~0.37 lb ai/A/application (0.41 kg ai/ha/application), with a 6- to 9-day retreatment interval, for a total rate of 1.48-1.52 lb ai/A (1.66-1.70 kg ai/ha).

Applications were made using ground equipment in a spray volume of 49.6-102.02 gal/A (555-1144 l/ha) of water with a spray adjuvant added. In one trial (Yates County, NY), additional raspberry samples were collected at 2, 4, 6, and 8 days following treatment to evaluate residue decline. We note that the 70% BAS 510 F WG formulation used in the field trials also contained another experimental active ingredient (BAS 500 F; pyraclostrobin) as part of the tank-mix; data for the BAS 500 F active ingredient were submitted separately.

Six blueberry trials were conducted in Regions 1 (1 trial), 2 (2 trials), 5 (2 trials), and 12 (1 trial) and three raspberry trials were conducted in Regions 1 (1 trial) and 12 (2 trials). The number and location of field trials conducted for blueberries and raspberries, as the representative crops of the berry group, are in accordance with the US EPA's guidance requirements (OPPTS 860.1500, Tables 2, 5, and 6). For the PMRA, the number and location of the submitted trials (see Table B.1.2) does not match Canadian guideline requirements (Dir 98-02).

During the course of the field trials, rainfall was reported as normal in the NY and OR trials; below normal in the GA trials; and above normal in the WI trials. Temperatures were reported as above normal in the WI and one of the GA trials, and normal in all the other trials. There was no irrigation in three (NY-1, WI-1, GA-1) of the trials.

Residues of BAS 510 F in/on blueberries and raspberries were quantitated using a concurrently validated LC/MS/MS method (D9908), the data collection method for plant commodities.

Maximum storage intervals of crop samples from harvest to analysis were 96 days (3.2 months) for blueberries and 83 days (2.7 months) for raspberries. Adequate storage stability data (refer to the DER for MRID 45405109) are available in five diverse matrices to support the storage conditions and intervals of samples from the submitted berry field trials.

3.2. Results

In blueberries, residues of BAS 510 F were 0.486-2.503 ppm in/on samples harvested on the day of the last of four foliar spray applications of the 70% WG formulation at 0.364-0.39 lb ai/A/application (0.407-0.437 kg ai/ha/application), for a total rate of 1.48-1.52 lb ai/A (1.66-1.70 kg ai/ha). Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on six samples of untreated blueberries.

In raspberries, residues of BAS 510 F were 1.388-3.308 ppm in/on samples harvested on the day of the last of four foliar spray applications of the 70% WG formulation at 0.3653-0.39 lb ai/A/application (0.408-0.437 kg ai/ha/application), for a total rate of 1.49-1.51 lb ai/A (1.67-1.69 kg ai/ha). Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on three samples of untreated raspberries. The residue decline data generated in New York State for raspberries indicated that residues of BAS 510 F decreased in a linear fashion. The residues decline data fits the linear equation $y = -0.1815x + 2.6763$ with a correlation coefficient (r²) of 0.9991. The equation predicts a half life of approximately 7 days and a complete dissipation of the residue by approximately 15 days.

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4. Deficiencies

None for US registration. Additional field trials are required by PMRA for Canadian registration.

5. References

None