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

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

MEMORANDUM

Date: July 2, 2003

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RAB2/HED (7509C)

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FREAS, HED, PMRA

DP Barcode: D278386

Petition No.: 1F06313

Citation: 45405122 Wofford, J.; Abdel-Baky, S. (2001) The Magnitude of BAS 510 F Residues in Peanut Raw Agricultural Commodities and Peanut Process Fractions: Final Report: Lab Project Number: 64106: 2001/5000870: 2000148. Unpublished study prepared by BASF Agro Research. 116 p.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 peanut nutmeat and hay. Twelve peanut trials were conducted in Regions 2 (8 trials; AL, GA, NC, and SC), 3 (1 trial; FL), 6 (2 trials; OK and TX), and 8 (1 trial; OK). The number and location of field trials satisfy the US EPA's data

(1)

requirement with respect to the geographic representation of residue data for peanuts. There are no specific requirements for crop field trials for peanuts in Canada.

At each test location, the 70% WG formulation of BAS 510 F was applied three times as a foliar spray at ~0.45 lb ai/A/application (~0.50 kg ai/ha/application), with a 13- to 15-day retreatment interval, for a total rate of 1.25-1.38 lb ai/A (1.40-1.55 kg ai/ha). Mature peanut plants were dug (inverted) 13-15 days following the last application and dried in the field for 3-8 days prior to collection of peanut nutmeat and hay. In one trial, peanut nutmeat and hay samples were collected at 7, 14, 21, 28, and 35 days following treatment to evaluate residue decline. An additional plot in the GA field trial (Tift County) was treated at an exaggerated rate (total of 4.10 lbs ai/A) to generate higher residue samples for processing.

Residues of BAS 510 F in/on peanut nutmeat and hay were quantitated using a validated LC/MS/MS method (D9908, the data collection method for plant commodities). Acceptable concurrent method validation data for peanut nutmeat and hay were included in the submission.

The maximum storage intervals from harvest-to-analysis were 117 days (3.8 months) for peanut nutmeat and 130 days (4.3 months) for peanut hay. Adequate freezer storage stability data in five diverse matrices (MRID 45405109) are available to support the storage conditions and intervals of samples from the submitted peanut field trials.

At the applied total rate of 1.25-1.38 lb ai/A (1.40-1.55 kg ai/ha), the ranges of BAS 510 F residues were <0.05 ppm (below the LOQ) to 0.054 ppm in/on treated samples of peanut nutmeat (quantifiable residues were only observed in/on one sample) and 2.61-30.8 ppm in/on treated samples of peanut hay. The residue decline data for peanut nutmeat indicate that BAS 510 F residues were below the LOQ (<0.05 ppm) at all harvest intervals. The residue decline data for peanut hay indicate that maximum residues of BAS 510 F occurred at 14-day PHI and declined after that point.

Residue data from the current submission are acceptable to fulfill US EPA crop field trial data requirements for peanut nutmeat and hay.

GLP Compliance

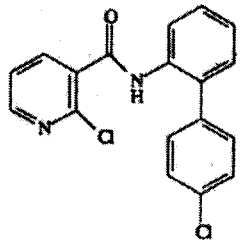
Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. No GLP deviations were reported which would impact the study results or their interpretation.

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:



1.2. Trial Locations

TABLE B.1.2. Trial Numbers and Geographical Locations

Crop	Peanuts			
NAFTA Growing Regions	Submitted		Requested	
	Canada	U.S.	Canada	U.S.
1				
1A				
2	8	8	na[1]	8
3	1	1	na[1]	1
4				
5				
5A				
5B				
6	2	2	na[1]	2
7				
7A				
8	1	1	na[1]	1
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
Total Trials	12	12	na[1]	12

1. There are no specific Canadian requirements for crop field trial studies for peanuts (Dir 98-02).

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
2	Wake, NC, 2000	Peanut, NCV-11	70% WG	Plants 20-22" tall, fruiting	0.454-0.455 [0.508-0.510]	14-15	3	Foliar spray/ 30-30.3	1.36 [1.52]	Agridex (1.25%, v:v)	Peanut plants were dug 13 days after last application (DALA) and field dried for 3 days prior to collection of nutmeat and hay.
				Plants 18-22" tall, fruiting							
				Plants 18-22" tall, fruiting, 2 weeks prior to digging							
2	Orangeburg, SC, 2000	Peanut, Georgia Green	70% WG	Plants 15" tall, pods	0.453-0.457 [0.507-0.512]	14	3	Foliar spray/ 18.8-19.0	1.37 [1.53]	Biosurf (0.25%, v:v)	Peanut plants were dug 14 DALA and field dried for 6 days prior to collection of nutmeat and hay.
2	Barnwell, SC, 2000	Peanut, Georgia Green	70% WG	Plants 15" tall, pods	0.459-0.463 [0.514-0.519]	14	3	Foliar spray/ 18.9-19.2	1.38 [1.55]	Biosurf (0.25%, v:v)	Peanut plants were dug 14 DALA and field dried for 6 days prior to collection of nutmeat and hay.
2	Tift, GA, 2000 (decline study)	Peanut, Georgia Green	70% WG	Appl. 1 and 2: plants 16-18" tall, pod fill Appl. 3: plants 16-18" tall, late pod fill	0.446-0.457 [0.500-0.512]	14	3	Foliar spray/ 28.7-29.6	1.36 [1.71]	Latron CS-7 (2pt/100gal)	Peanut plants dug 7, 14, 21, 28, and 35 DALA and field dried for 5-7 days prior to collection of nutmeat and hay.
	(processing study)				1.34-1.38[1] [1.50-1.55]	14	3	Foliar spray/ 28.8-29.8	4.10 [4.59]	Latron CS-7 (2pt/100gal)	Peanut plants were dug 14 DALA and field dried for 5 days prior to collection of nutmeat and hay.

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
2	Henry, AL, 2000	Peanut, Georgia Green	70% WG	Plants 12-16" tall, main pod fill	0.45-0.454 [0.504-0.509]	13-14	3	Foliar spray/ 12.8-14.0	1.35 [1.52]	Latron CS-7 (2pt/100gal)	Peanut plants were dug 15 DALA and field dried for 7 days prior to collection of nutmeat and hay.
				Plants 12-16" tall, main pod fill							
				Plants 12-18" tall, late pod fill							
2	Terrell, GA, 2000	Peanut, Agra Teck 201	70% WG	Plants 10-18" tall, pod fill	0.44-0.451 [0.493-0.505]	13-15	3	Foliar spray/ 12.8-13.4	1.34 [1.50]	Latron CS-7 (0.25gal/ 100gal)	Peanut plants dug 14 DALA and field dried for 5 days prior to collection of nutmeat and hay.
				Plants 12-18" tall, pod fill							
				Plants 12-18" tall, advanced pod fill							
2	Clarke, GA, 2000	Peanut, Valencia	70% WG	Plants 18-22" tall, pod fill	0.450-0.453 [0.504-0.507]	13-15	3	Foliar spray/ 28.8-29.4	1.36 [1.52]	Peptoil (crop oil concentrate) (1.0%, v/v)	Peanut plants were dug 14 DALA and field dried for 5 days prior to collection of nutmeat and hay.
				Plants 20-24" tall, 18-20 nodes; pods maturing							
				Plants 20-24" tall, 18-20 nodes; pod 85% mature							

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
2	Peach, GA, 2000	Peanut, Georgia Green	70% WG	Plants 14-18" tall, pegging Plants 15-18" tall, heavy pod set/growth Plants 17-19" tall, pod maturing	0.452-0.454 [0.506-0.509]	14	3	Foliar spray/ 23.7-24.3	1.36 [1.52]	Surf-Ac 820 (0.25%, v/v)	Peanut plants were dug 14 DALA and field dried for 3 days prior to collection of nutmeat and hay.
3	Jackson, FL, 2000	Peanut, Georgia Green	70% WG	Plants 12-18" tall, pod filling Plants 12-18" tall, pod filling Plants 12-18" tall, late pod filling	0.446-0.451 [0.500-0.505]	14	3	Foliar spray/ 34.4-36.6	1.35 [1.51]	Latron CS-7 (2pt/100gal)	Peanut plants were dug 13 DALA and field dried for 7 days prior to collection of nutmeat and hay.
6	Waller, TX, 2000	Peanut, Pronto	70% WG	Plants 15" tall, pegging mid bloom Plants 14" tall, pegging mid bloom Late pegging	0.41-0.42 [0.46-0.47]	14-15	3	Foliar spray/ 18-18.8	1.25 [1.40]	Latron CS-7 (0.25%, v:v)	Peanut plants were dug 14 DALA and field dried for 8 days prior to collection of nutmeat and hay.
6	Caddo, OK, 2000	Peanut, Spanco	70% WG	Plants 13-17" tall, R6 Plants 13-17" tall, R6	0.44-0.454 [0.49-0.509]	13-15	3	Foliar spray/ 13.8-14.7	1.35 [1.51]	Hi Yield 90/10 adjuvant (8oz/100gal)	Peanut plants were dug 13 DALA and field dried for 6 days prior to collection of nutmeat and hay.

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
				Plants 13-17" tall, R7-R8							
8	Washita, OK, 2000	Peanut, Spanco	70% WG	Plants 12-18" tall, R6	0.444-0.448 [0.497-0.502]	14	3	Foliar spray/ 13.8-14.8	1.34 [1.51]	Hi Yield 90/10 adjuvant (8oz/100gal)	Peanut plants were dug 13 DALA and field dried for 3 days prior to collection of nutmeat and hay.
				Plants 12-20" tall, R6-7							
				Plants 12-20" tall, R7-R8							

[1] Samples from this plot were used in the peanut processing study (refer to 45405122.DE2).

1.3. Post-harvest Procedures

Peanut plants were dug (inverted) 13-15 days following the last application and dried in the field for 3-8 days prior to collection of peanut nutmeat and hay. A single untreated and duplicate treated samples of peanut nutmeat and hay were harvested from each field trial; sample weights were ≥2.2 (≥1 kg) and 1.1 lbs (0.5 kg) for nutmeat and hay, respectively. Additional samples of peanut nutmeat and hay were collected from a GA (Tift County) trial at various time intervals for residue decline samples. All samples of peanut nutmeat and hay were bagged and stored frozen (temperature not specified) on the day of collection. Field samples were shipped frozen within 1-37 days of harvest to BASF Agricultural Products Center (Research Triangle Park, NC) for analysis.

Table 1.3.1. Summary of Storage Conditions

Matrix	RAC or Extract	Storage Temperature (°C) (Analytical Laboratory)	Duration
Peanut	nutmeat	<-10	84-117 days (2.8-3.9 months)
	hay	<-10	93-130 days (3.1-4.3 months)

1.4. Analytical Methods

Samples of peanut nutmeat and hay were analyzed for residues of BAS 510 F using LC/MS/MS method D9908, the data collection method for plants. Briefly, samples of peanut nutmeat and hay were extracted with methanol:water:2N HCl (70:25:5, v:v:v) using Polytron homogenization. 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 and evaporated to dryness. 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 peanut nutmeat and hay. Concurrent recoveries for a broad range of spiking levels presented in Table 2.1 below.

2. Results

Table 2.1. Summary of Concurrent Analytical Method Validation.

Crop Matrix	Fortification Level (ppm)	Recoveries (%)	Mean Recovery ± SD
Peanut, nutmeat	0.05, 1.00	66, 66, 67, 76, 77, 81	72 ± 7
Peanut, hay	0.05-30.0	72, 72, 77, 80, 84, 87, 93, 100	83 ± 10

Table 2.2. Residue Data from Crop Field Trials in Peanut with BAS 510 F.

Location (County, State, Year)	Crop Variety	Commodity	Formulation	Total Rate (lbs ai/A) [kg ai/ha]	PHI [1] (days)	BAS 510 F residues (ppm)
Wake, NC, 2000	NCV-11	nutmeat	70% WG	1.36 [1.52]	13 (3)	<0.05, 0.054
Orangeburg, SC, 2000	Georgia Green	nutmeat	70% WG	1.37 [1.53]	14 (6)	<0.05, <0.05
Barnwell, SC, 2000	Georgia Green	nutmeat	70% WG	1.38 [1.55]	14 (6)	<0.05, <0.05
Tift, GA, 2000 (decline study)	Georgia Green	nutmeat	70% WG	1.36 [1.52]	7 (7)	<0.05, <0.05
					14 (5)	<0.05, <0.05
					21 (6)	<0.05, <0.05
					28 (5)	<0.05, <0.05
					35 (6)	<0.05, <0.05
Jackson, FL, 2000	Georgia Green	nutmeat	70% WG	1.35 [1.51]	13 (7)	<0.05, <0.05
Henry, AL, 2000	Georgia Green	nutmeat	70% WG	1.35 [1.52]	15 (7)	<0.05, <0.05
Terrel, GA, 2000	Agra Teck 201	nutmeat	70% WG	1.34 [1.50]	14 (5)	<0.05, <0.05
Clarke, GA, 2000	Valencia	nutmeat	70% WG	1.36 [1.52]	14 (5)	<0.05, <0.05
Peach, GA, 2000	Georgia Green	nutmeat	70% WG	1.36 [1.52]	14 (3)	<0.05, <0.05
Waller, TX, 2000	Pronto	nutmeat	70% WG	1.25 [1.40]	14 (8)	<0.05, <0.05
Caddo, OK, 2000	Spanco	nutmeat	70% WG	1.35 [1.51]	13 (6)	<0.05, <0.05
Washita, OK, 2000	Spanco	nutmeat	70% WG	1.34 [1.50]	13 (3)	<0.05, <0.05
Wake, NC, 2000	NCV-11	hay	70% WG	1.36 [1.52]	13 (3)	18.2, 22.2
Orangeburg, SC, 2000	Georgia Green	hay	70% WG	1.37 [1.53]	14 (6)	22.8, 25.6
Barnwell, SC, 2000	Georgia Green	hay	70% WG	1.38 [1.55]	14 (6)	27.8, 30.8
Tift, GA, 2000 (decline study)	Georgia Green	hay	70% WG	1.36 [1.52]	7 (7)	5.67, 5.89
					14 (5)	6.79, 8.78
					21 (6)	3.46, 4.28
					28 (5)	3.91, 7.58 [2]

Table 2.2. Residue Data from Crop Field Trials in Peanut with BAS 510 F.						
Location (County, State, Year)	Crop Variety	Commodity	Formulation	Total Rate (lbs ai/A) [kg ai/ha]	PHI [1] (days)	BAS 510 F residues (ppm)
					35 (6)	3.17, 4.62
Jackson, FL, 2000	Georgia Green	hay	70% WG	1.35 [1.51]	13 (7)	6.23, 7.17
Henry, AL, 2000	Georgia Green	hay	70% WG	1.35 [1.52]	15 (7)	5.43, 6.25
Terrel, GA, 2000	Agra Teck 201	hay	70% WG	1.34 [1.50]	14 (5)	2.61, 3.68
Clarke, GA, 2000	Valencia	hay	70% WG	1.36 [1.52]	14 (5)	28.1, 28.8
Peach, GA, 2000	Georgia Green	hay	70% WG	1.36 [1.52]	14 (3)	10.1, 15.0
Waller, TX, 2000	Pronto	hay	70% WG	1.25 [1.40]	14 (8)	--[3]
Caddo, OK, 2000	Spanco	hay	70% WG	1.35 [1.51]	13 (6)	6.08, 7.21
Washita, OK, 2000	Spanco	hay	70% WG	1.34 [1.50]	13 (3)	6.68, 11.3

[1] The first number represents the number of day after the last application peanut plants were dug; the number in parentheses represents the number of days plants were dried in the field prior to collection of nutmeat and hay.
[2] Highest value of triplicate analyses reported.
[3] Hay samples were erroneously not collected from this site.

Table 2.3. Summary of Residue Data from Crop Field Trials in Peanut 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.
Peanut, nutmeat	1.25-1.38 [1.40-1.55]	13-15	<0.05	0.054	<0.052	<0.05 [<0.05]	0.001
Peanut, hay	1.25-1.38 [1.40-1.55]	13-15	2.61	30.8	29.3	14.6 [10.7]	9.58

3. Discussion

3.1. Methods

Mature peanut plants were dug (inverted) 13-15 days following the last of three foliar spray applications of the 70% WG formulation at ~0.45 lb ai/A/application (0.50 kg ai/ha/application), with a 13- to 15-day retreatment interval, for a total rate of 1.25-1.38 lb ai/A. Applications were made using ground equipment in 12.8-36.6 gal/A (143.4-409.9 L/ha) of water with a spray adjuvant added. Inverted peanut plants were allowed to dry in the field 3-8 days prior to collection of peanut nutmeat and hay. Hay samples were not collected from one trial. In one trial (Tift County, GA), peanut nutmeat and hay samples were collected at 7, 14, 21, 28, and 35 days following treatment to evaluate residue decline. An additional plot in the GA field trial (Tift County) was treated at an exaggerated rate to generate samples for processing (refer to the processed peanut DER for MRID 45405122.de02 for details of the study).

Twelve peanut trials were conducted in Regions 2 (8 trials), 3 (1 trial), 6 (2 trials), and 8 (1 trial). For the EPA, the number and location of field trials conducted for peanuts are in accordance with the guidance requirements (OPPTS 860.1500, Tables 1 and 5). The PMRA has no data requirements for crop field trials for peanuts.

Residues of BAS 510 F in/on peanut nutmeat and hay were quantitated using LC/MS/MS method D9908, the data collection method for plant commodities. Adequate concurrent method validation data for peanut nutmeat and hay were included in the submission.

The maximum storage intervals from harvest to analysis were 117 days (3.8 months) for peanut nutmeat and 130 days (4.3 months) for peanut hay. Adequate storage stability data in five diverse matrices (refer to the DER for MRID 45405109) are available to support the storage conditions and intervals of samples from the submitted peanut field trials.

3.2. Results

Residues of BAS 510 F were <0.05-0.054 ppm in/on peanut nutmeat samples (quantifiable residues were only observed in/on one sample) and 2.61-30.8 ppm in/on peanut hay dug 13-15 days and dried 3-8 days following the last of three foliar spray applications of the 70% WG formulation at 0.41-0.46 lb ai/A/application (0.46-0.52 kg ai/ha/application) with a 13- to 15-day retreatment interval, for a total rate of 1.25-1.38 lb ai/A (1.40-1.55 kg ai/ha). Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on 12 samples of untreated peanut nutmeat and 11 samples of untreated peanut hay. The residue decline data for peanut nutmeat indicate that residues were below the LOQ (<0.05 ppm) at all harvest intervals. The residue decline data for peanut hay indicate that maximum residues occurred at 14-day PHI and declined after that point.

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.