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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DP Barcode: D281841 and D297173

Petition No.: 1F06313

Citation: 45623405 Haughey, D.; Abdel-Baky, S. (2002) Magnitude of BAS 510 F and BAS 500 F Residues in Dry and Succulent Peas: Final Report: Lab Project Number: 2001/5003246: 66696: F200112. Unpublished study prepared by BASF Agro Research. 95 p.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 representative pea crops (succulent edible-podded pea, succulent shelled pea, and dried shelled pea) of the Legume Vegetables Crop Group (Group 6). Field trial data for beans were submitted in a separate study (see DER of MRID

(1)

45405120). Only rotational crop studies are available for soybean seed (see DER of MRID 45623412).

BASF Corporation has submitted residue data on dry and succulent peas from trials conducted during the 2001 growing season. Nine dried shelled pea trials were conducted in Regions 5 (1 trial; ND), 11 (4 trials; ID, OR, and WA), and 14 (Canada; 4 trials; AB and SK), eight succulent shelled pea trials were conducted in Regions 1 (1 trial; PA), 2 (2 trials; GA and NC), 5 (3 trials; MN and WI), 5B (Canada; 1 trial; QB), and 11 (1 trial; WA), and three succulent edible-podded pea trials were conducted in Regions 5 (1 trial; MN), 11 (1 trial; WA), and 12 (1 trial; OR). The number and location of field trials meets EPA's requirements for residue data for dried shelled pea, succulent shelled pea, and succulent edible-podded pea. Although the petitioner did not fully meet the field trial requirements as set out in PMRA's Dir 98-02, sufficient information was presented to support a MRL for the use of BAS 510 F on peas.

Dried shelled peas were harvested 20-22 days and succulent shelled peas and succulent edible-podded peas were harvested 6-8 days following the last of two foliar applications of the 70% wettable granule (WG) formulation at ~0.5 lb ai/A/application (0.56 kg ai/ha/application), with a 4- to 6-day retreatment interval, for a total rate of 0.99-1.03 lb ai/A (1.01-1.15 kg ai/ha). Applications were made using ground equipment in a spray volume of 10.2-36.2 gal/A (114-405 l/ha) of water with a spray adjuvant added.

Residues of BAS 510 F in/on the test commodities were quantitated using LC/MS/MS method D9908, the data collection method for plant commodities. Acceptable concurrent method validation data for dried shelled pea, succulent shelled pea, and succulent edible-podded pea 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 138 days (4.5 months) for dried shelled peas, 224 days (7.4 months) for succulent shelled peas, and 163 days (5.4 months) for succulent edible-podded peas samples.

Residues of BAS 510 F in/on treated samples were: (i) <0.05-0.46 ppm in/on dried shelled peas harvested at 20- to 22-day PHIs; (ii) <0.05-0.39 ppm in/on succulent shelled peas harvested at 6- to 7-day PHIs; and (iii) 0.60-1.53 ppm in/on succulent edible-podded peas harvested at 6- to 7-day PHIs.

Residue decline studies were not conducted for dry or succulent peas; however, residue decline data are available for dry and succulent beans (refer to the DER for MRID 45405120).

Residue data from the current submission are acceptable to fulfill crop field trial data requirements for peas. In addition, when combined with the submitted residue data for dried and succulent beans (refer to the DER for MRID 45405120), the residue data from the current submission fulfill crop field trial data requirements for Crop Group 6, provided soybeans are excluded.

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

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:

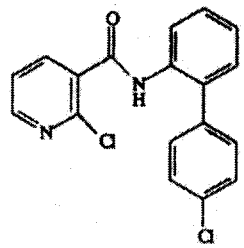

TABLE B.1.2. Trial Numbers and Geographical Locations

NAFTA Growing Region	Peas, dried shelled			Peas, edible podded			Peas, Succulent shelled		
	Submitted	Requested		Submitted	Requested		Submitted	Requested	
		Canada	US[1]		Canada[2]	US[2]		Canada	US
1							1	1	1 in either zone 1 or 2
1A								1	
2							2		
3									
4									
5	1	2		1			3	3	4
5A									
6							1	2	
7									
7A									
8									
9									
10									
11	4			1			1		2
12				1				1	1
13									
14	4	6							
15									
16									
17									
18									
19									
20									
21									
Total	9	8	5	3	3	3	8	8	8

[1] Trial regions are not specifically recommended for dried shelled peas, but are based on the acreage and production of dried garden pea and lentils (97% and 95% U.S. crop production, respectively, in Region 11).
[2] Regions are not recommended for crops requiring ≤3 trials.
[3] Either region is acceptable

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
Peas, Dried Shelled											
5	Cass, ND, 2001	Dry pea; Athos	70% WG	Mature plants Pod drying	0.51-0.524 [0.57-0.59]	5	2	Foliar spray/ 10.27-10.48	1.034 [1.16]	Activator 90	Shelled peas harvested 20 days after last application (DALA).
11	Grant, WA, 2001	Dry pea; Lazer	70% WG	Post bloom 21 Days before harvest	0.5 [0.56]	5	2	Foliar spray/ 20-20.1	1.0 [1.12]	Induce	Shelled peas harvested 21 DALA.
11	Grant, WA, 2001	Dry pea; Estancia	70% WG	75% Mature 90% Mature; beginning to dry	0.5 [0.56]	5	2	Foliar spray/ 19.9-20.1	1.0 [1.12]	Induce	Shelled peas harvested 21 DALA.
11	Umatilla, OR, 2001	Dry pea; Paso	70% WG	Late bloom; pod fill Pod fill	0.5-0.5197 [0.56-0.58]	5	2	Foliar spray/ 19.45-20.796	1.0197 [1.14]	Agri-Dex	Shelled peas harvested 22 DALA.
11	Payette, ID, 2001	Dry pea; 09690470	70% WG	End of bloom	0.498-0.502 [0.56]	5	2	Foliar spray/ 29.8-30.0	1.00 [1.12]	R-11	Shelled peas harvested 21 DALA.
14	Edmonton, AB, 2001	Dry pea; Admiral	70% WG	Pods 75% full size Pods mature	0.496-0.499 [0.56]	5	2	Foliar spray/ 11.66-11.73	0.995 [1.11]	Merge	Shelled peas harvested 21 DALA.
14	Wetaskiwin, AB, 2001	Dry pea; Croma	70% WG	Mature pods	0.489-0.498 [0.55-0.56]	6	2	Foliar spray/ 11.57-11.79	0.987 [1.11]	Merge	Shelled peas harvested 21 DALA.

51

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
14	Hoodoo, SK, 2001	Dry pea; Delta	70% WG	Pods at full maturity 30-40% Pods dried	0.498-0.501 [0.56]	6	2	Foliar spray/ 11.7-11.77	0.999 [1.12]	Merge	Shelled peas harvested 21 DALA.
14	RM 463, SK, 2001	Dry pea; Delta	70% WG	50% Pod maturity 50% Pods at final size	0.496-0.498 [0.56]	5	2	Foliar spray/ 11.67-11.71	0.994 [1.11]	Merge	Shelled peas harvested 20 DALA.
Peas, Succulent Shelled											
1	Lehigh, PA, 2001	Succulent pea; Wando	70% WG	Pod set Late bloom/mid pod set	0.508-0.517 [0.57-0.58]	4	2	Foliar spray/ 35.6-36.2	1.025 [1.15]	Penetrator or Penetrator Plus	Shelled peas harvested 7 DALA.
2	Wake, NC, 2001	Succulent pea; Green Arrow	70% WG	Pod fill/blooming Blooming/pod fill	0.5-0.51 [0.56-0.57]	5	2	Foliar spray/ 30.06-30.6	1.01[1.13]	X-77	Shelled peas harvested 7 DALA.
2	Grady, GA, 2001	Succulent pea; Progress No.9	70% WG	Pod fill	0.5-0.51 [0.56-0.57]	5	2	Foliar spray/ 10.2-10.7	1.01[1.13]	Latron CS-7	Shelled peas harvested 7 DALA.
5	Freeborn, MN, 2001	Succulent pea; Knight	70% WG	Podding Pod fill	0.5 [0.56]	4	2	Foliar spray/ 15.88-17.7	1.0 [1.12]	Crop Oil Plus	Shelled peas harvested 7 DALA.
5	Wilkin, MN, 2001	Succulent pea; Top Pod	70% WG	BBCH 71 70% Pods at typical length	0.5 [0.56]	4	2	Foliar spray/ 20.06-20.09	1.0 [1.12]	Agri-dex	Shelled peas harvested 7 DALA.

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	Succulent pea; Lazor	70% WG	Pod fill beginning; end of flowering 50% Pod filling	0.503-0.508 [0.56-0.57]	5	2	Foliar spray/ 20.1-20.3	1.011 [1.13]	Class Preference	Shelled peas harvested 8 DALA.
5B	Haut-Richelieu, QB, 2001	Succulent pea; XP 353	70% WG	First flower open Pods developing	0.493-0.507 [0.55-0.57]	6	2	Foliar spray/ 24.8-25.7	1.000 [1.12]	Surf 92	Shelled peas harvested 7 DALA.
11	Grant, WA, 2001	Succulent pea; Case Load	70% WG	50% Mature pod formation 75% Mature pod formation	0.5 [0.56]	5	2	Foliar spray/ 20.1	1.0 [1.12]	Induce	Shelled peas harvested 7 DALA.
Peas, Succulent, Edible Podded											
5	Steele, MN, 2001	Succulent pea; Casiadia	70% WG	Podding	0.5-0.505 [0.56]	4	2	Foliar spray/ 17.05-17.8	1.005 [1.12]	Crop Oil Plus	Podded peas harvested 6 DALA.
11	Grant, WA, 2001	Succulent pea; Sugar Snap	70% WG	Full bloom Full bloom plus 7 days	0.5 [0.56]	5	2	Foliar spray/ 20.1-20.2	1.0 [1.12]	Induce	Podded peas harvested 7 DALA.
12	Benton, OR, 2001	Succulent pea; Snap pea SP704-3-8	70% WG	Bloom - pod filling Pod filling	0.504-0.5046 [0.56-0.57]	4	2	Foliar spray/ 20.18-20.20	1.0086 [1.12]	Agri-Dex	Podded peas harvested 7 DALA.

1.3. Post-harvest Procedures

A single untreated and duplicate treated samples of mature peas were harvested from each field trial 20-22, 7-8, or 6-7 days following the last application for dried shelled peas (seed), succulent shelled peas (seed without pod), or succulent edible-podded peas (seed with pod intact), respectively. Specific harvesting procedures were not described; however, each sample weighed ≥2.2 lbs (≥1 kg). Samples were bagged and stored frozen (temperature not specified) on the day of harvest. Samples were shipped frozen within 0-43 days of harvest to BASF Agro Research (Research Triangle Park, NC) for analysis. Dried shelled pea, succulent shelled pea, and succulent edible-podded pea samples were analyzed within 2 days of extraction.

Table 1.3.1. Summary of Storage Conditions

Matrix	RAC or Extract	Storage Temperature (°C) (Analytical Laboratory)	Duration
Dry pea	Dried shelled pea seed (RAC)	<-10	86-138 days (2.8-4.5 months)
Succulent pea	Shelled pea seed (RAC)		123-224 days (4.0-7.4 months)
	Edible-podded pea (RAC)		154-163 days (5.1-5.4 months)

1.4. Analytical Methods

Samples of dried shelled pea, succulent shelled pea, and succulent edible-podded pea 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 dried shelled pea, succulent shelled pea, and succulent edible-podded pea.

2. Results

Table 2.1. Summary of Concurrent Analytical Method Validation.

Crop Matrix	Fortification Level (ppm)	Recoveries (%)	Mean Recovery ± SD
Dried shelled pea	0.05, 1.00	81, 86, 87, 94	87 ± 5
Succulent shelled pea	0.05, 1.00	69, 74, 94, 99	84 ± 15
Succulent edible-podded pea	0.05, 5.00	96, 118	107

Table 2.2. Residue Data from Crop Field Trials in Dry and Succulent Peas 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)
Pea, Dried Shelled						
Cass, ND, 2001	Dry pea; Athos	Shelled pea seed	70% WG	1.03 [1.15]	20	<0.05, 0.05
Grant, WA, 2001	Dry pea; Lazer	Shelled pea seed	70% WG	1.00 [1.12]	21	0.09, 0.23
Grant, WA, 2001	Dry pea; Estancia	Shelled pea seed	70% WG	1.00 [1.12]	21	0.10, 0.13
Umatilla, OR, 2001	Dry pea; Paso	Shelled pea seed	70% WG	1.02 [1.14]	22	0.11, 0.11
Payette, ID, 2001	Dry pea; 09690470	Shelled pea seed	70% WG	1.00 [1.12]	21	0.07, 0.11
Edmonton, AB, 2001	Dry pea; Admiral	Shelled pea seed	70% WG	1.00 [1.12]	21	0.29, 0.32
Wetaskiwin, AB, 2001	Dry pea; Croma	Shelled pea seed	70% WG	0.99 [1.11]	21	0.12, 0.21
Hoodoo, SK, 2001	Dry pea; Delta	Shelled pea seed	70% WG	1.00 [1.12]	21	0.31, 0.46
RM 463, SK, 2001	Dry pea; Delta	Shelled pea seed	70% WG	0.99 [1.11]	20	0.20, 0.26
Pea, Succulent Shelled						
Lehigh, PA, 2001	Succulent pea; Wando	Shelled pea seed	70% WG	1.03 [1.15]	7	<0.05, <0.05
Wake, NC, 2001	Succulent pea; Green Arrow	Shelled pea seed	70% WG	1.01 [1.13]	7	<0.05, 0.06
Grady, GA, 2001	Succulent pea; Progress No.9	Shelled pea seed	70% WG	1.01 [1.13]	7	0.23, 0.24
Freeborn, MN, 2001	Succulent pea; Knight	Shelled pea seed	70% WG	1.00 [1.12]	7	0.15, 0.15
Wilkin, MN, 2001	Succulent pea; Top Pod	Shelled pea seed	70% WG	1.00 [1.12]	7	0.06, 0.07
Pepin, WI, 2001	Succulent pea; Lazor	Shelled pea seed	70% WG	1.01 [1.13]	8	0.34, 0.39
Haut-Richelieu, QB, 2001	Succulent pea; XP 353	Shelled pea seed	70% WG	1.00 [1.12]	7	0.18, 0.19
Grant, WA, 2001	Succulent pea; Case Load	Shelled pea seed	70% WG	1.00 [1.12]	7	<0.05, <0.05
Pea, Succulent Edible-Podded						

Table 2.2. Residue Data from Crop Field Trials in Dry and Succulent Peas 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)
Steele, MN, 2001	Succulent pea; Casiadia	Pod with pea seed	70% WG	1.01 [1.13]	6	1.25, 1.53
Grant, WA, 2001	Succulent pea; Sugar Snap	Pod with pea seed	70% WG	1.00 [1.12]	7	0.60, 0.68
Benton, OR, 2001	Succulent pea; Snap pea SP704-3-8	Pod with pea seed	70% WG	1.01 [1.13]	7	0.86, 1.08

Table 2.3. Summary of Residue Data from Crop Field Trials in Dry and Succulent Peas with BAS 510 F.

Commodity	Total Applic. Rate (lb ai/A)	PHI (days)	Residue Levels (ppm)				
			Minimum	Maximum	HAFT	Mean [median]	Std. Dev.
Dried Shelled Pea	0.99-1.03	20-22	<0.05	0.46	0.39	0.18 [0.13]	0.11
Succulent Shelled Pea	1.00-1.03	7-8	<0.05	0.39	0.37	0.14 [0.11]	0.11
Succulent Edible-Podded Pea	1.00-1.01	6-7	0.60	1.53	1.39	1.00 [0.97]	0.36

3. Discussion

3.1. Methods

In studies conducted in 2001, dried shelled peas were harvested 20-22 days and succulent shelled peas and succulent edible-podded peas were harvested 6-8 days following the last of two foliar applications of the 70% WG formulation at ~0.5 lb ai/A/application (0.56 kg ai/ha/application), with a 4- to 6-day retreatment interval, for a total rate of 0.99-1.03 lb ai/A (0.11-1.15 kg ai/ha). Applications were made using ground equipment in a spray volume of 10.2-36.2 gal/A (114-405 l/ha) of water with a spray adjuvant added. We note that the 70% BAS 510 F WG formulation used in the pea 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 are not reviewed herein.

Nine dried shelled pea trials were conducted in Regions 5 (1 trial; ND), 11 (4 trials; ID, OR, and WA), and 14 (Canada; 4 trials; AB and SK), eight succulent shelled pea trials were conducted in Regions 1 (1 trial; PA), 2 (2 trials; GA and NC), 5 (3 trials; MN and WI), 5B (Canada; 1 trial; QB), and 11 (1 trial; WA), and three succulent edible-podded pea trials were conducted in Regions 5 (1 trial; MN), 11 (1 trial; WA), and 12 (1 trial; OR). Geographic representation of residue data for dry and succulent peas is adequate. The number and location of field trials conducted for dried shelled pea, succulent shelled pea, and succulent edible-podded pea are in

accordance with EPA's guidance requirements (OPPTS 860.1500, Tables 1, 5, and 6). Based on the number, location and overall results, the PMRA has determined that no additional residue trials will be needed to support a domestic (Canadian) registration for dried shelled pea, succulent shelled pea, and succulent edible-podded pea.

Residues of BAS 510 F in/on dried shelled pea, succulent shelled pea, and succulent edible-podded pea were quantitated using LC/MS/MS method D9908 (the data collection method for plant commodities). Acceptable concurrent method validation data for dried shelled pea, succulent shelled pea, and succulent edible-podded pea were included in the submission.

Maximum storage intervals of crop samples from harvest to analysis were 138 days (4.5 months) for dried shelled peas, 224 days (7.4 months) for succulent shelled peas, and 163 days (5.4 months) for succulent edible-podded peas. 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 dry and succulent pea field trials.

3.2. Results

In dried shelled peas, residues of BAS 510 F were <0.05-0.46 ppm in/on samples harvested 20-22 days following the last of two foliar spray applications of the 70% WG formulation at 0.489-0.524 lb ai/A/application (0.55-0.59 kg ai/ha/application), for a total rate of 0.99-1.03 lb ai/A (1.11-1.15 kg ai/ha). Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on nine samples of untreated dried shelled pea.

In succulent shelled peas, residues of BAS 510 F were <0.05-0.39 ppm in/on samples harvested 7-8 days following the last of two foliar spray applications of the 70% WG formulation at 0.493-0.517 lb ai/A/application (0.55-0.58 kg ai/ha/application), for a total rate of 1.0-1.03 lb ai/A (1.12-1.15 kg ai/ha). Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on eight samples of untreated succulent shelled pea.

In succulent edible-podded peas, residues of BAS 510 F were 0.60-1.53 ppm in/on samples harvested 6-7 days following the last of two foliar spray applications of the 70% WG formulation at 0.5-0.505 lb ai/A/application (0.56-0.57 kg ai/ha/application), for a total rate of 1.0-1.01 lb ai/A (1.12-1.13 kg ai/ha). Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on three samples of untreated succulent edible-podded pea.

Residue decline studies were not conducted for dry or succulent peas; however, residue decline data are available for dry and succulent beans (refer to the DER for MRID 45405120).

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.