Pyraclostrobin/BAS 500 F/PC Code 099100/BASF Corporation
DACO 7.4.1/OPPTS 860.1500/OECD IIA 6.3.1, 6.3.2, 6.3.3 and IIIA 8.3.1, 8.3.2, 8.3.3
Crop Field Trial - Citrus Fruits Crop Group

Reviewer	Manying Xue, Chemist RAB3/HED (7509C)	Date: 07/22/04
Approved by	Leung Cheng, Ph.D., Senior Chemist RAB3/HED (7509C)	Date: 07/22/04

This DER was originally prepared under contract by Dynamac Corporation (20440 Century Boulevard, Suite 100; Germantown, MD 20874; submitted 02/26/2004). The DER has been reviewed by the HED and revised to reflect current OPP policies.

STUDY REPORT:

45903601 Jordan, J. (2002) Magnitude of BAS 500 02 F and BAS 510 02 F Residues in Citrus: Final Report: Lab Project Number: 2002/5002446:BASF Study Number 64978. Unpublished study prepared by BASF Agro Research. 129 p.

EXECUTIVE SUMMARY:

BASF Corporation has submitted field trial data for residues of pyraclostrobin and its metabolite 500-3 in/on citrus fruits (grapefruit, lemon, and orange). A total of 24 citrus fruit field trials were conducted during the 2001-2002 growing season. Six trials were conducted on grapefruit encompassing Regions 3 (FL; 3 trials), 6 (TX; 1 trial), and 10 (CA, 2 trials); five trials were conducted on lemon encompassing Regions 3 (FL; 1 trial) and 10 (AZ and CA; 4 trials); and thirteen trials were conducted on oranges encompassing Regions 3 (FL; 8 trials), 6 (TX; 1 trial), and 10 (CA; 4 trials).

At each test location, a total of four broadcast foliar applications of the 20% BAS 500 F WG formulation were made to citrus fruit trees (grapefruit, lemon, and orange) at ~0.2 lb ai/A/application (first and second applications) and ~0.25 lb ai/A/application (third and fourth applications) with 7- to 11-day retreatment intervals, for a total seasonal application rate of ~0.9 lb ai/A. Applications were made using ground equipment in either concentrate spray volumes (50-100 GPA) or dilute spray volumes (100-400 GPA) with a spray adjuvant added to

limit of quantitation (LOQ) wa: 0.02 ppm for each analyte (pyraclostrobin and BF 500-3) in/on all citrus fruit matrices. This m thod is adequate for data collection based on acceptable concurrent method recovery da: .

The maximum storage interval: of crop samples from harvest to analysis were 146 days (4.8 months) for grapefruit whc e fruit, 136 days (4.5 months) for lemon whole fruit, 186 days (6.1 months) for orange whole uit, 160 days (5.3 months) for orange pulp, and 180 days (5.9 months) for orange peel. N storage stability data have been submitted with this petition. Available storage stability data ndicated that residues of pyraclostrobin and its metabolite BF 500-3 are relatively stable u der frozen storage conditions in/on fortified samples of grape juice, sugar beet tops and roots tomatoes, and wheat grain and straw for up to 25 months, and in/on fortified samples of pean nutmeat and processed oil for up to 19 months. The storage stability data can be translated support the storage intervals for citrus fruits for this study (D269668, etc., L. Cheng, 11/2 /2001).

The results from the citrus frui field trials show that the maximum combined residues of pyraclostrobin and its metaboli BF 500-3 were 0.627 ppm in/on grapefruit, 1.137 ppm in/on lemon, and 1.278 ppm in/on or nge harvested 0 days following the last of four applications for a total application rate of 0.88-0. 1 lb ai/A. The residue data reflect trials with both concentrate and dilute spray volumes.

Residues in oranges were prim rily located in/on the orange peel. The combined residues of pyraclostrobin and its metaboli BF 500-3 were 0.184-3.634 ppm in/on orange peel and <0.04-0.118 ppm in/on orange ulp separated from whole oranges harvested at the 0-day PHI.

STUDY/WAIVER ACCEPT BILITY/DEFICIENCIES/CLARIFICATIONS:

Under the conditions and para eters used in the study, the field trial residue data are classified as scientifically acceptable. The ceptability of this study for regulatory purposes is addressed in the forthcoming U.S. EPA Re: due Chemistry Summary Document, DP Barcode D290369.

COMPLIANCE:

Signed and dated GLP, Qualit Assurance and Data Confidentiality statements were provided. No deviations from regulatory equirements were reported.

A. BACKGROUND INF ORMATION

Pyraclostrobin is a fungicide t at is structurally related to the naturally occurring strobilurins, compounds derived from som fungal species. Pyraclostrobin is also in the same chemical class as azoxystrobin (PC 128810), egistered for many crops and turf/lawn, and trifloxystrobin (PC 129112) which recently was g anted a "reduced risk" status as a fungicide on many crops. The biochemical mode of action o these compounds is inhibition of electron transport in pathogenic fungi.

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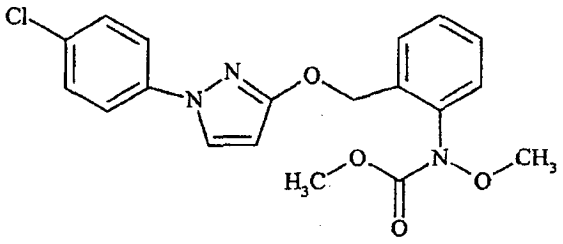
Table 1. Pyraclostrobin Nomenclature.	
Compound	
Common name	Pyraclostrobin
Company experimental name	BAS 500 F
IUPAC name	methyl *N*-{2-[1-(4-chlorophenyl)-1*H*-pyrazol-3-yloxymethyl]phenyl}(*N*-methoxy)carbamate
CAS name	methyl [2-[[[1-(4-chlorophenyl)-1*H*-pyrazol-3-yl]oxy]methyl]phenyl]methoxycarbamate
CAS #	175013-18-0
End-use products/EPs	20% water dispersible granular formulation (WG; product name: Cabrio™ EG Fungicide; EPA Reg. No. 7969-187/EPA File Symbol 7969-RIT) and 2 lb/gal emulsifiable concentrate formulation (EC; Headline® Fungicide; EPA Reg. No. 7969-186/EPA File Symbol 7969-RIA)

Pyraclostrobin technical is a white to light beige solid.

TABLE A.2. Physicochemical Properties		
Parameter	Value	Reference[1]
Melting point	63.7-65.2 °C	D269848 & D274191
Density	1.285g/cm^3 at 20°C	D269848 & D274191
Water solubility (20°C)	2.41 mg/L in deionized water at 20°C 1.9 mg/L in buffer system pH 7 at 20°C 2.3 mg/L in buffer system pH 4 at 20°C 1.9 mg/L in buffer system pH 9 at 20°C	D269848 & D274191
Solvent solubility (mg/L at 20°C)	acetone (≥160 mg/L); methanol (11 mg/L); 2-propanol (3.1 mg/L); ethyl acetate (≥160 mg/L); acetonitrile (≥76 mg/L); dichloromethane (≥110 mg/L); toluene (≥100 mg/L); n-heptane (0.36 mg/L); 1-octanol (2.4 mg/L); olive oil (2.9 mg/L); DMF (≥62 mg/L).	D269848 & D274191
Vapour pressure at 25°C	2.6 x 10^{-10} hPa (at 20°C); 6.4 x 10^{-10} hPa	D269848 & D274191
Dissociation constant (pK_a)	Does not dissociate in water. There are no dissociable moieties.	D269848 & D274191
Octanol/water partition coefficient Log(K_{OW})	n-Octanol/water partition coefficient (K_{ow}) at room temperature (=K_{ow} of 3.80, pH 6.2; =log K_{ow} 4.18, pH 6.5).	D269848 & D274191

[1] Product Chemistry data were reviewed by the Registration Division (D269848 and D274191, 5/3/01, 5/15/01, and 6/7/01, S. Malak)

B. EXPERIMENTAL DESIGN

B.1. Study Site Information

TABLE B.1.1. Trial Site Conditions.

Trial Identification (City, State; Year)		Soil characteristics				Meteorological data	
		Type	%OM	pH	CEC	*Overall monthly rainfall range (inches)*	*Overall temperature range (°C)* [1]
Grapefruit field trials							
Oviedo, FL; 2001		and	Not applicable			Not reported	18-28
Loxahatchee, FL; 2001		and	Not applicable			Not reported	22-27
Clermont, FL; 2001-2002		and	Not applicable			Not reported	9-31
Raymondville, TX; 2001-2002	Sandy	clay loam	Not applicable			Not reported	9-23
Porterville, CA; 2001		oam	Not applicable			Not reported	11-23
Terra Bella, CA; 2001		lay	Not applicable			Not reported	9-21
Lemon field trials							
Palm City, FL; 2002		and	Not applicable			Not reported	29-33
Porterville, CA; 2002		lay	Not applicable			Not reported	12-17
Porterville, CA; 2002		lay	Not applicable			Not reported	7-17
Waddell, AZ; 2001	Sa	y loam	Not applicable			Not reported	9-16
Hyder, AZ; 2001	Sa	y loam	Not applicable			Not reported	16-22
Orange field trials							
Oviedo, FL; 2002		and	Not applicable			Not reported	20-25
Oviedo, FL; 2001		and	Not applicable			Not reported	18-28
Oviedo, FL; 2001		and	Not applicable			Not reported	19-28
Loxahatchee, FL; 2001		and	Not applicable			Not reported	26-29
Stuart, FL; 2002		and	Not applicable			Not reported	21-27
Hobe Sound, FL; 2001-2002		and	Not applicable			Not reported	14-24
Winter Garden, FL; 2001-2002		and	Not applicable			Not reported	9-32
Clermont, FL; 2002		and	Not applicable			Not reported	30-35
Raymondville, TX; 2001-2002	Sand	clay loam	Not applicable			Not reported	8-22
Porterville, CA; 2002		Clay	Not applicable			Not reported	8-13
Richgrove, CA; 2002	Sa	dy loam	Not applicable			Not reported	8-14
Porterville, CA; 2002		Clay	Not applicable			Not reported	11-15
Porterville, CA; 2002		oam	Not applicable			Not reported	12-24

[1] Air temperature was only provided fo days of application.

The petitioner did not include ny information pertaining to weather conditions over the course of the field trials except to des ribe the conditions which occurred during application of the test substance. The petitioner did ndicate that weather conditions including temperature were normal for the duration of the rials except for below average rainfall in the orange CA sites, lemon AZ sites, and one grap ruit and one orange FL site.

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TABLE B.1.2. Study Use Pattern.

Location (City, State; Year)	EP [1]	Method; Timing	Vol. (GPA [2])	Rate (lb ai/A)	RTI [3] (days)	Total Rate (lb ai/A)	Tank Mix Adjuvants
Grapefruit field trials							
Oviedo, FL; 2001	20% WG	1: Broadcast foliar; starting color break	179.79	0.20	–	0.90	Triangle DW
		2: Broadcast foliar; color developing	179.37	0.20	9		Triangle DW
		3: Broadcast foliar; color developing	180.32	0.25	11		Triangle DW
		4: Broadcast foliar; mature fruit	179.95	0.25	10		Triangle DW
Loxahatchee, FL; 2001	20% WG	1: Broadcast foliar; mature fruit	89.8	0.21	–	0.91	Latron B-1956
		2: Broadcast foliar; mature	87.1	0.20	11		Latron B-1956
		3: Broadcast foliar; mature	87.3	0.25	10		Latron B-1956
		4: Broadcast foliar; mature	90.03	0.25	10		Latron B-1956
Clermont, FL; 2001-2002	20% WG	1: Broadcast foliar; mature	272.43	0.20	–	0.90	Diamond R Spread-R
		2: Broadcast foliar; mature	275.42	0.20	10		Diamond R Spread-R
		3: Broadcast foliar; mature	282.71	0.25	9		Diamond R Spread-R
		4: Broadcast foliar; mature	288.72	0.25	10		Diamond R Spread-R
Raymondville, TX; 2001-2002	20% WG	1: Broadcast foliar; medium-large fruit, 4" diameter	73.88	0.20	–	0.90	R-56
		2: Broadcast foliar; medium-large fruit, 4" diameter	74.13	0.20	10		R-56
		3: Broadcast foliar; medium-large fruit, 4" diameter	74.43	0.25	10		R-56
		4: Broadcast foliar; medium-large fruit, 4" diameter	74.2178	0.25	10		R-56
Porterville, CA; 2001	20% WG	1: Broadcast foliar; fruit sizing	89.58	0.20	–	0.90	Latron B-1956
		2: Broadcast foliar; fruit size 5-6"	89.53	0.20	10		Latron B-1956
		3: Broadcast foliar; fruit sizing, near maturity 5.5-7"	89.23	0.25	10		Latron B-1956
		4: Broadcast foliar; mature, 6-7" fruit	90.75	0.25	10		Latron B-1956
Terra Bella, CA; 2001	20% WG	1: Broadcast foliar; fruit set 5-6"	222.1	0.20	–	0.90	Latron B-1956
		2: Broadcast foliar; fruit set 6-7"	226.03	0.20	10		Latron B-1956
		3: Broadcast foliar; fruit sizing, near maturity 6-7"	227.44	0.25	10		Latron B-1956
		4: Broadcast foliar; mature, 6-7" fruit	224.7	0.25	9		Latron B-1956

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TABLE B.1.2. Study Use Patter

Location (City, State; Year)	EP [1]	M	ethod; Timing	Vol. (GPA [2])	Rate (lb ai/A)	RTI [3] (days)	Total Rate (lb ai/A)	Tank Mix Adjuvants
Lemon Field Trials								
Palm City, FL; 2002	20% WG	1: Broadcas	foliar; fruit	82.5	0.20	--	0.91	Latron B-1956
		2: Broadcas	foliar; fruiting	91.28	0.21	10		Latron B-1956
		3: Broadcas	foliar; fruiting	89.44	0.25	10		Latron B-1956
		4: Broadcas	foliar; mature	90.75	0.25	10		Latron CS-7
Porterville, CA; 2002	20% WG	1: Broadcas	foliar; fruit maturation	226.69	0.20	--	0.90	Latron B-1956
		2: Broadcas	foliar; fruit maturation	241.78	0.20	11		Latron B-1956
		3: Broadcas	foliar; fruit maturation	238.96	0.25	10		Latron B-1956
		4: Broadcas	foliar; mature fruit	234.71	0.25	11		Latron B-1956
Porterville, CA; 2002	20% WG	1: Broadcas	foliar; fruit maturation	77.04	0.20	--	0.90	Latron B-1956
		2: Broadcas	foliar; fruit maturation	76.68	0.20	10		Latron B-1956
		3: Broadcas	foliar; mature fruit	73.96	0.25	10		Latron B-1956
		4: Broadcas	foliar; mature fruit	76.09	0.25	10		Latron B-1956
Waddell, AZ; 2001	20% WG	1: Broadca	foliar; mature fruit	77.75	0.19	--	0.88	Agri-Dex
		2: Broadca	foliar; mature fruit	76.82	0.20	10		Agri-Dex
		3: Broadca 70% color	foliar; mature fruit with	76.7	0.25	11		Agri-Dex COC
		4: Broadca 100% colo	foliar; mature fruit with	76.65	0.25	10		Agri-Dex COC
Hyder, AZ; 2001	20% WG	1: Broadca fruit color	foliar; mature fruit, 30%	195.6	0.20	--	0.89	Agri-Dex
		2: Broadca 35% color	foliar; mature fruit, 30-	198.25	0.20	10		Agri-Dex
		3: Broadca	foliar; mature 80% color	198.25	0.25	11		Agri-Dex COC
		4: Broadca color	foliar; mature fruit, 10%	197	0.25	10		Agri-Dex COC
Orange Field Trials								
Oviedo, FL; 2002	20% WG	1: Broadca fruit	foliar; 3-4" diameter	149.82	0.20	--	0.90	Triangle DW
		2: Broadca	foliar; 3-4" fruit	148.94	0.20	9		Triangle DW
		3: Broadca	foliar; nearing maturity	150.55	0.25	10		Triangle DW
		4: Broadca	foliar; mature fruit	150.12	0.25	10		Triangle DW
Oviedo, FL; 2001	20% WG	1: Broadca nearing m	foliar; some color break, urity	91.47	0.20	--	0.91	Triangle DW
		2: Broadca	foliar; color developing	89.74	0.20	9		Triangle DW
		3: Broadca	foliar; color developing	91.32	0.25	11		Triangle DW
		4: Broadca	foliar; mature fruit	92.99	0.26	10		Triangle DW

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TABLE B.1.2. Study Use Pattern.

Location (City, State; Year)	EP [1]	Method; Timing	Vol. (GPA [2])	Rate (lb ai/A)	RTI [3] (days)	Total Rate (lb ai/A)	Tank Mix Adjuvants
Oviedo, FL; 2001	20% WG	1: Broadcast foliar; 2-3" diameter - starting color break	150.08	0.20	--	0.90	Triangle DW
		2: Broadcast foliar; color developing	149.21	0.20	9		Triangle DW
		3: Broadcast foliar; color developing	151.44	0.25	11		Triangle DW
		4: Broadcast foliar; mature fruit	150.2	0.25	10		Triangle DW
Loxahatchee, FL; 2001	20% WG	1: Broadcast foliar; mature fruit	88.9	0.20	--	0.90	Latron B-1956
		2: Broadcast foliar; mature	86.9	0.20	11		Latron B-1956
		3: Broadcast foliar; mature	88.1	0.25	10		Latron B-1956
		4: Broadcast foliar; mature	90.03	0.25	10		Latron B-1956
Stuart, FL; 2002	20% WG	1: Broadcast foliar; mature fruit	165.57	0.20	--	0.90	Latron B-1956
		2: Broadcast foliar; mature fruit	163.43	0.20	11		Latron B-1956
		3: Broadcast foliar; mature fruit	161.9	0.25	10		Latron B-1956
		4: Broadcast foliar; mature fruit	163.43	0.25	10		Latron B-1956
Hobe Sound, FL; 2001-2002	20% WG	1: Broadcast foliar; full size maturing	88.43	0.20	--	0.90	None
		2: Broadcast foliar; mature	87.94	0.20	11		Latron B-1956
		3: Broadcast foliar; mature	86.4	0.25	10		Latron B-1956
		4: Broadcast foliar; mature	87.4	0.25	10		Latron B-1956
Winter Garden, FL; 2001-2002	20% WG	1: Broadcast foliar; mature	198.79	0.20	--	0.90	Diamond R Spread-R
		2: Broadcast foliar; mature	198.74	0.20	10		Diamond R Spread-R
		3: Broadcast foliar; mature	203.65	0.25	9		Diamond R Spread-R
		4: Broadcast foliar; mature	207.55	0.25	10		Diamond R Spread-R
Clermont, FL; 2002	20% WG	1: Broadcast foliar; mature crop	75.29	0.20	--	0.90	Diamond R Spread-R
		2: Broadcast foliar; mature	74.45	0.20	9		Diamond R Spread-R
		3: Broadcast foliar; mature	74.08	0.25	11		Diamond R Spread-R
		4: Broadcast foliar; mature	74.81	0.25	10		Diamond R Spread-R

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TABLE B.1.2. Study Use Patter

Location (City, State; Year)	EP [1]		ethod; Timing	Vol. (GPA [2])	Rate (lb ai/A)	RTI [3] (days)	Total Rate (lb ai/A)	Tank Mix Adjuvants
Raymondville, TX; 2001-2002	20% WG	1: Broadcas fruit, 3-3.5"	foliar; medium-large liameter	250.4	0.20	--	0.91	R-56
		2: Broadcas fruit, 3-3.5'	foliar; medium-large liameter	251.68	0.20	10		R-56
		3: Broadcas fruit, 3-3.5'	foliar; medium-large liameter	253.36	0.25	10		R-56
		4: Broadcas fruit, 3-3.5'	foliar; medium-large liameter	253.95	0.25	10		R-56
Porterville, CA; 2002	20% WG	1: Broadca:	foliar; mature	351.25	0.20	--	0.90	Latron B-1956
		2: Broadca:	foliar; mature fruit	355.55	0.20	10		Latron B-1956
		3: Broadca:	foliar; mature fruit	361.94	0.25	10		Latron B-1956
		4: Broadca	foliar; mature fruit	352.38	0.25	10		Latron B-1956
Richgrove, CA; 2002	20% WG	1: Broadca	foliar; mature fruit	77.47	0.20	--	0.90	Latron B-1956
		2: Broadca	foliar; mature fruit	81.3	0.20	10		Latron B-1956
		3: Broadca	foliar; mature fruit	77.22	0.25	10		Latron B-1956
		4: Broadca	foliar; mature fruit	78.38	0.25	11		Latron B-1956
Porterville, CA; 2002	20% WG	1: Broadca	foliar; mature fruit	348.64	0.20	--	0.90	Latron B-1956
		2: Broadca	foliar; mature fruit	350.73	0.20	7		Latron B-1956
		3: Broadca	foliar; mature fruit	350.65	0.25	10		Latron B-1956
		4: Broadca	foliar; mature fruit	345.7	0.25	10		Latron B-1956
Porterville, CA; 2002	20% WG	1: Broadca	foliar; mature fruit	78.22	0.20	--	0.89	Latron B-1956
		2: Broadca	foliar; mature fruit	78.4	0.20	10		Latron B-1956
		3: Broadca	foliar; mature fruit	77.13	0.25	10		Latron B-1956
		4: Broadca	foliar; mature fruit	76.65	0.25	11		Latron B-1956

[1] EP = End-use Product
[2] GPA = Gallons per acre
[3] RTI = Retreatment Interval

TABLE B.1.3. Trial Numbers a d Geographical Locations.

NAFTA Growing Region	Grapef Submitted	Car	it .equested da	US [1]	Lemon Submitted	Requested Canada	US [1]	Orange Submitted	Requested Canada	US [1]
3	3			3	1		1	8		8
6	1			1				1		1
10	2			2	4		4	4		3
Total	6			6	5		5	13		12

[1] As required under OPPTS 860.1500, ? bles 2 and 5 for grapefruit, lemon, and orange as the representative crops of the Citrus Fruits crop group.

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B.2. Sample Handling and Preparation

A single untreated and duplicate treated samples of grapefruit, lemon, and orange whole fruit were harvested on the day (0-day PHI) of the last application. Specific harvesting procedures were not described. Samples were bagged and stored frozen (temperature not specified) on the day of harvest. Samples of citrus fruits were shipped frozen within 4-35 days of harvest to BASF Agro Research (Research Triangle Park, NC) for analysis. At BASF, a portion of the orange whole fruit sample from each trial site was separated by hand into peel and pulp samples.

B.3. Analytical Methodology

Samples of whole citrus fruits (grapefruit, lemon, and orange), and orange pulp and peel were analyzed for residues of pyraclostrobin and its metabolite BF 500-3 using LC/MS/MS, BASF Method Number D9908. A brief description of the method was included in the submission. BASF Method Number D9908 is similar to the proposed enforcement method (LC/MS/MS BASF Method Number D9808) submitted in conjunction with a previous pyraclostrobin petition (PP#0F06139; DP Barcodes D269668, etc., L. Cheng, 11/28/01). Method D9908 used an alternate extraction option: citrus fruit commodities were extracted with methanol:water:2 N HCl (7:2.5:0.5; v:v:v) instead of methanol:water (7:3; v:v). Residues are analyzed by LC/MS/MS. For quantitation, the product/daughter ion for the transition *m/z* 388 → 194 for pyraclostrobin (BAS 500 F) and *m/z* 358 → 164 for BAS 500-3 are measured. The method limit of quantitation (LOQ) was 0.02 ppm for each analyte (pyraclostrobin and BF 500-3) in/on all citrus fruit matrices. The limit of detection (LOD), defined as the lowest standard level injected with an analysis set, was 0.1 ng/mL for each analyte.

C. RESULTS AND DISCUSSION

Sample storage conditions and intervals are summarized in Table C.2. The maximum storage intervals of crop samples from harvest to analysis were 146 days (4.8 months) for grapefruit whole fruit, 136 days (4.5 months) for lemon whole fruit, 186 days (6.1 months) for orange whole fruit, 160 days (5.3 months) for orange pulp, and 180 days (5.9 months) for orange peel. No storage stability data have been submitted. Available storage stability data indicated that residues of pyraclostrobin and its metabolite BF 500-3 are relatively stable under frozen storage conditions in/on fortified samples of grape juice, sugar beet tops and roots, tomatoes, and wheat grain and straw for up to 25 months, and in/on fortified samples of peanut nutmeat and processed oil for up to 19 months. The storage stability data can be translated to support the storage intervals for citrus fruits for this study (D269668, etc., L. Cheng, 11/28/2001).

Concurrent method recovery data are presented in Table C.1. Samples of whole citrus fruits (grapefruit, lemon, and orange), and orange pulp and peel were analyzed for residues of pyraclostrobin and its metabolite BF 500-3 using LC/MS/MS, BASF Method Number D9908. The method LOQ was 0.02 ppm for each analyte. This method is adequate for data collection based on acceptable concurrent method recovery data. Apparent residues of pyraclostrobin and

its metabolite BF 500-3 were e: :h below the method LOQ (<0.02 ppm) in/on all untreated samples of grapefruit, lemon, o ange, orange peel, and orange pulp.

Residue data from the citrus fie d trials are reported in Table C.3. A summary of residue data for whole citrus fruit (grapefruit, le non, and orange), and orange peel and pulp following treatment with the 20% WG formulation s presented in Table C.4. The combined residues of pyraclostrobin and its metaboli : BF 500-3 were 0.074-0.627 ppm in/on grapefruit, 0.403-1.137 ppm in/on lemon, and 0.168-1. 78 ppm in/on orange whole fruits harvested 0 days following the last of four applications for a t al application rate of 0.88-0.91 lb ai/A. Residues in oranges were primarily located in/on th orange peel. The combined residues of pyraclostrobin and its metabolite BF 500-3 were 0.18 -3.634 ppm in/on orange peel and <0.04-0.118 ppm in/on orange pulp separated from whole ora: ges harvested at the 0-day PHI. The residue data reflect trials with both concentrate and dilu : spray volumes.

A total of 24 citrus fruit field t als were conducted during the 2001-2002 growing season. Six trials were conducted on grape uit encompassing Regions 3 (FL; 3 trials), 6 (TX; 1 trial), and 10 (CA, 2 trials); five trials were (nducted on lemon encompassing Regions 3 (FL; 1 trial) and 10 (AZ and CA; 4 trials); and thir en trials were conducted on oranges encompassing Regions 3 (FL; 8 trials), 6 (TX; 1 trial), a d 10 (CA; 4 trials). The number and locations of field trials are in accordance with OPPTS Gu ieline 860.1500.

TABLE C.1. Summary of Cor urrent Recoveries of Pyraclostrobin and its Metabolite BF 500-3 from Citrus Fruit Cor nodities.

Matrix	Spike le	l (ppm)	Sample size (*n*)	Recoveries (%)	Mean ± std dev
Pyraclostrobin					
Grapefruit	0	2	2	73, 73	79 ± 7
			2	85, 85	
Lemon	0	2	3	76, 94, 94	89 ± 8
			1	89	
			1	94	
Orange	0	2	4	73, 79, 84, 91	91 ± 14
			3	92, 105, 113	
Orange pulp	0	2	3	78, 82, 83	85 ± 9
			1	87	
			2	80, 102	
Orange peel	0	2	3	65, 78, 148 [1]	91 ± 20
			3	82, 97, 122	
			1	102	
BF 500-3					
Grapefruit		2	2	64, 68	76 ± 12
			2	86, 86	
Lemon		2	3	84, 94, 121	94 ± 16

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TABLE C.1. Summary of Concurrent Recoveries of Pyraclostrobin and its Metabolite BF 500-3 from Citrus Fruit Commodities.

Matrix	Spike level (ppm)	Sample size (n)	Recoveries (%)	Mean ± std dev
	1	1	85	
	2	1	86	
Orange	0.02	4	66, 71, 90, 118	89 ± 18
	2	3	85, 89, 102	
Orange pulp	0.02	3	69, 75, 77	79 ± 8
	2	1	80	
	10	2	77, 95	
Orange peel	0.02	3	64, 69, 91	85 ± 18
	2	3	74, 99, 113	
	5	1	86	

[1] This fortification recovery of pyraclostrobin is above the acceptable level. Due to residue levels in the samples run with the sets being significantly greater than the LOQ the set was passed based on the acceptability of the high fortification. These recoveries are not used for the statistical calculations but are reported.

TABLE C.2. Summary of Storage Conditions.

Matrix (RAC or Extract)	Storage Temp. (°C)	Actual Storage Duration [1]	Interval of Demonstrated Storage Stability [2]
Grapefruit, whole fruit	<-10	84-146 days (2.8-4.8 months)	The available storage stability data indicate that residues of pyraclostrobin and its metabolite BF 500-3 are relatively stable under frozen storage conditions in/on fortified samples of grape juice, sugar beet tops and roots, tomatoes, and wheat grain and straw for up to 25 months, and in/on fortified samples of peanut nutmeat and processed oil for up to 19 months.
Lemon, whole fruit	<-10	14-136 days (0.5-4.5 months)	
Orange, whole fruit	<-10	31-186 days (1.0-6.1 months)	
Orange, pulp	<-10	30-160 days (1.0-5.3 months)	
Orange, peel	<-10	32-180 days (1.1-5.9 months)	

[1] All citrus fruit samples were analyzed within 0-3 days of extraction.
[2] Refer to storage stability data reviewed in conjunction with a previous pyraclostrobin petition (PP#0F06139; DP Barcode D269668, etc., L. Cheng, 11/28/01).

TABLE C.3. Residue Data from Citrus Fruit Field Trials with Pyraclostrobin.

Trial ID (City, State; Year)	Region	Crop; Variety	Commodity or Matrix	Total Rate (lb ai/A)	PHI (days)	Residues (ppm)		
						Pyraclostrobin	BF 500-3	Total
Grapefruit field trials								
Oviedo, FL; 2001	3	Grapefruit; Flame	whole fruit	0.90	0	0.228, 0.25	<0.02, <0.02	<0.248, <0.27
Loxahatchee, FL; 2001	3	Grapefruit; White Marsh	whole fruit	0.91	0	0.58, 0.591	0.038, 0.036	0.618, 0.627
Clermont, FL; 2001-2002	3	Grapefruit; Flame	whole fruit	0.90	0	0.054, 0.066	<0.02, <0.02	<0.074, <0.086
Raymondville, TX; 2001-2002	6	Grapefruit; Rio Red	whole fruit	0.90	0	0.0667, 0.081	<0.02, <0.02	<0.0867, <0.101
Porterville, CA; 2001	10	Grapefruit; Mello Gold	whole fruit	0.90	0	0.1, 0.115	<0.02, <0.02	<0.12, <0.135

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TABLE C.3. Residue Data fro Citrus Fruit Field Trials with Pyraclostrobin.

Trial ID (City, State; Year)	Region	Crop; Variety	Commodity or Matrix	Total Rate (lb ai/A)	PHI (days)	Residues (ppm)		
						Pyraclostrobin	BF 500-3	Total
Terra Bella, CA; 2001	10	Grapefruit; Oroblanco	whole fruit	0.90	0	0.0702, 0.1	<0.02, <0.02	<0.0902, <0.12
Lemon field trials								
Palm City, FL; 2002	3	Lemon; Bearss	whole fruit	0.91	0	0.547, 0.568	<0.02, <0.02	<0.567, <0.588
Porterville, CA; 2002	10	Lemon; Prior	whole fruit	0.90	0	0.383, 0.654	<0.02, <0.02	<0.403, <0.674
Porterville, CA; 2002	10	Lemon; Lisbon	whole fruit	0.90	0	0.691, 1.11	0.022, 0.027	0.713, 1.137
Waddell, AZ; 2001	10	Lemon; Lisban	whole fruit	0.88	0	0.496, 0.574	<0.02, <0.02	<0.516, <0.594
Hyder, AZ; 2001	10	Lemon; Limonaire	whole fruit	0.89	0	0.686, 0.803	0.03402, 0.029	0.720, 0.832
Orange field trials								
Oviedo, FL; 2002	3	Orange; Valencia	whole fruit	0.90	0	0.405, 0.534	0.032, 0.033	0.437, 0.567
			peel	0.90	0	2.52 [1], 3.36 [1]	0.180 [1], 0.186 [1]	2.700, 3.546
			pulp	0.90	0	0.065, 0.074	<0.02, <0.02	<0.085, <0.094
Oviedo, FL; 2001	3	Orange; Navel	whole fruit	0.91	0	0.148, 0.237	<0.02, <0.02	<0.168, <0.257
			peel	0.91	0	0.164, 0.505	<0.02, <0.02	<0.184, <0.525
			pulp	0.91	0	<0.02, <0.02	<0.02, <0.02	<0.04, <0.04
Oviedo, FL; 2001	3	Orange; Hamlin	whole fruit	0.90	0	0.609, 0.616	0.034, 0.038	0.643, 0.654
			peel	0.90	0	1.79, 2.27	0.025, 0.030	1.815, 2.30
			pulp	0.90	0	0.021, 0.025	<0.02, <0.02	<0.041, <0.045
Loxahatchee, FL; 2001	3	Orange; Hamlin	whole fruit	0.90	0	1.060, 1.205	0.062, 0.073	1.122, 1.278
			peel	0.90	0	3.43, 3.6	0.095, 0.034	3.525, 3.634
			pulp	0.90	0	0.048, 0.098	<0.02, <0.02	<0.068, <0.118
Stuart, FL; 2002	3	Orange; Valencia, Swingle	whole fruit	0.90	0	0.411, 0.436	0.028, 0.034	0.439, 0.470
			peel	0.90	0	1.63, 2.15	0.120, 0.168	1.75, 2.318
			pulp	0.90	0	0.020, 0.026	<0.02, <0.02	<0.04, <0.046
Hobe Sound, FL; 2001-2002	3	Orange; Pineapple	whole fruit	0.90	0	0.631, 0.945	0.026, 0.038	0.657, 0.983
			peel	0.90	0	1.53, 1.83	<0.02, 0.027	<1.55, 1.857
			pulp	0.90	0	0.046, 0.052	<0.02, <0.02	<0.066, <0.072
Winter Garden, FL; 2001-2002	3	Orange; Hamlin	whole fruit	0.90	0	0.333, 0.356 [1]	<0.02, <0.02 [1]	<0.353, <0.376
			peel	0.90	0	0.641, 0.793	0.028, 0.027	0.669, 0.820
			pulp	0.90	0	<0.02, <0.02	<0.02, <0.02	<0.04, <0.04
Clermont, FL; 2002	3	Orange; Valencia	whole fruit	0.90	0	0.159[1], 0.392[1]	<0.02 [1], 0.043 [1]	<0.179, 0.435
			peel	0.90	0	0.595, 0.954	0.032, 0.081	0.627, 1.035
			pulp	0.90	0	<0.02, <0.02	<0.02, <0.02	<0.04, <0.04

TABLE C.3. Residue Data from Citrus Fruit Field Trials with Pyraclostrobin.

Trial ID (City, State; Year)	Region	Crop; Variety	Commodity or Matrix	Total Rate (lb ai/A)	PHI (days)	Residues (ppm)		
						Pyraclostrobin	BF 500-3	Total
Raymondville, TX; 2001-2002	6	Orange; Everhard Navel	whole fruit	0.91	0	0.199, 0.275	<0.02, <0.02	<0.219, <0.295
			peel	0.91	0	0.672, 0.717 [1]	0.023, <0.02 [1]	0.695, <0.737
			pulp	0.91	0	<0.02, <0.02	<0.02, <0.02	<0.04, <0.04
Porterville, CA; 2002	10	Orange; Navel	whole fruit	0.90	0	0.217, 0.287	<0.02, <0.02	<0.237, <0.307
			peel	0.90	0	0.547, 0.721	<0.02, <0.02	<0.567, <0.741
			pulp	0.90	0	<0.02, 0.02	<0.02, <0.02	<0.04, <0.04
Richgrove, CA; 2002	10	Orange; Navel	whole fruit	0.90	0	0.216, 0.249 [1]	<0.02, <0.02 [1]	<0.236, <0.269
			peel	0.90	0	0.54, 0.666	0.026, 0.030	0.566, 0.696
			pulp	0.90	0	<0.02, 0.030	<0.02, <0.02	<0.04, <0.05
Porterville, CA; 2002	10	Orange; Navel	whole fruit	0.90	0	0.268, 0.287	<0.02, <0.02	<0.288, <0.307
			peel	0.90	0	0.775, 0.994	<0.02, <0.02	<0.795, <1.014
			pulp	0.90	0	<0.02, <0.02	<0.02, <0.02	<0.04, <0.04
Porterville, CA; 2002	10	Orange; Cutter	whole fruit	0.89	0	0.156, 0.188	<0.02, <0.02	<0.176, <0.208
			peel	0.89	0	0.275[1], 0.908[1]	<0.02 [1], 0.029 [1]	<0.295, 0.937
			pulp	0.89	0	<0.02, <0.02	<0.02, <0.02	<0.04, <0.04

[1] Duplicate or triplicate analyses of a single sample; the maximum residue is reported.

TABLE C.4. Summary of Residue Data from Citrus Fruit Crop Field Trials with Pyraclostrobin.

Commodity	Total Applic. Rate (lb ai/A)	PHI (days)	Analyte	Residue Levels (ppm)						
				n	Min.	Max.	HAFT[1]	Median (STMdR[2])	Mean (STMR[3])	Std. Dev.
Grapefruit, whole fruit	0.90-0.91	0	pyraclostrobin	12	0.054	0.591	0.586	0.10	0.19	0.194
			BF 500-3	12	<0.02	0.038	0.037	0.02	0.02	0.007
			Total	12	0.074	0.627	0.623	0.12	0.21	0.201
Lemon, whole fruit	0.88-0.91	0	pyraclostrobin	10	0.383	1.110	0.901	0.61	0.65	0.199
			BF 500-3	10	<0.02	0.034	0.032	0.02	0.02	0.005
			Total	10	0.403	1.137	0.925	0.63	0.67	0.202
Orange, whole fruit	0.89-0.91	0	pyraclostrobin	26	0.148	1.205	1.133	0.310	0.416	0.282
			BF 500-3	26	<0.02	0.073	0.068	0.02	0.029	0.014
			Total	26	0.168	1.278	1.200	0.330	0.445	0.294
Orange, peel	0.89-0.91	0	pyraclostrobin	26	0.164	3.600	3.515	0.851	1.330	1.006
			BF 500-3	26	<0.02	0.186	0.183	0.027	0.051	0.053
			Total	26	0.184	3.634	3.580	0.879	1.380	1.040
Orange, pulp	0.89-0.91	0	pyraclostrobin	26	<0.02	0.098	0.073	0.020	0.031	0.021
			BF 500-3	26	<0.02	<0.02	<0.02	<0.02	<0.02	0.0
			Total	26	<0.04	0.118	0.093	<0.04	0.051	0.021

[1] HAFT = Highest Average Field Trial.
[2] STMdR = Supervised Trial Median Residue.

[3] STMR = Supervised Trial Mean Residu

D. CONCLUSION

The combined residues of pyra ostrobin and its metabolite BF 500-3 were 0.074-0.627 ppm in/on grapefruit, 0.403-1.137 p n in/on lemon, and 0.168-1.278 ppm in/on orange whole fruits harvested 0 days following the ist of four applications for a total application rate of 0.88-0.91 lb ai/A with 7- to 11-day retreatm nt intervals. Residues in oranges were primarily located in/on the orange peel. The combinec residues of pyraclostrobin and its metabolite BF 500-3 were 0.184-3.634 ppm in/on orange eel and <0.04-0.118 ppm in/on orange pulp separated from whole oranges harvested at the -day PHI. The residue data reflect trials with both concentrate and dilute spray volumes.

E. REFERENCES

DP Barcodes: D269668, D272 71, D272789, D274095, D274192, D274471, D274957, D275843, and I 278429

Subject: PP#0F06139. F Code 099100. Pyraclostrobin on Various Crops: Bananas (import), Barley Berries, Bulb Vegetables, Citrus Fruits, Cucurbit Vegetables, Dried Shelled P a & Bean (except Soybean), Fruiting Vegetables, Grapes, Grass, Peanut, Pistachi , Root Vegetables (except Sugar Beet), Rye, Snap Beans, Stone Fruits, Strawber y, Sugar Beet, Tree Nuts, Tuberous and Corm Vegetables, and Wheat. Review of Analytical Methods and Residue Data. EPA File Symbols: 7969-RIT, 796 RIA. CAS #175013-18-0.

From: L. Cheng

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Dated: 11/28/01

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F. DOCUMENT TRAC ING

RDI:ChemTeam:06/29/04:L.C eng: 07/22/04
Petition Number(s): PP#2F06 31
DP Barcode(s): D290342, D2 0343, and D290369
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