US EPA ARCHIVE DOCUMENT

DP Barcode: 155478
Shaughnessy No.: 109801
Date Out of EFGWB: NOV 26 1990

To: Susan Lewis/James Stone
Product Manager #21
Registration Division (H7505C)

From: Emil Regelman, Supervisory Chemist
Environmental Chemistry Review Section #2
Environmental Fate and Ground Water Branch/EFED (H7507C)

Through: Henry Jacoby, Chief
Environmental Fate and Ground Water Branch/EFED (H7507C)

Attached, please find the EFGWB review of . . .

Reg./File # : 000264-00453

Common Name : Iprodione; Glycophene

Chemical Name : 3-(3,5-dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazolidinecaboxamide or 3-(3,5-dichlorophenyl)-N-isopropyl-2,4-dioxoimidazolidine-1-carboxamide

Type Product : Fungicide

Product Name : Rovral 4F

Company Name : Rhône-Poulenc Agricultural Company

Purpose : Review of an Aerobic Aquatic Metabolism study (#162-4) (Conditional requirement for use on rice)

Date Received: 8/27/1990 **EFGWB # (s):** 90-0867

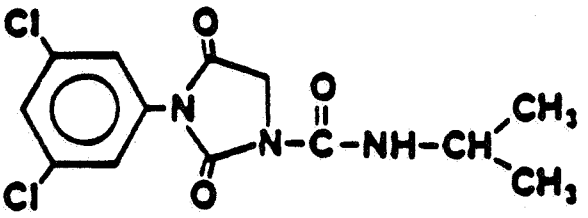
Date Completed: 11/9/1990

Deferrals to:

_____ Ecological Effects Branch, EFED
_____ Science Integration and Policy Staff, EFED
_____ Non-Dietary Exposure Branch, HED
_____ Dietary Exposure Branch, HED
_____ Toxicology Branch I, HED
_____ Toxicology Branch II, HED

1. **CHEMICAL:**

Common name: Iprodione
Chemical name: 3-(3,5-dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazolidinecarboxamide or 3-(3,5-dichlorophenyl)-N-isopropyl-2,4-dioxoimidazolidine-1-carboxamide.
CAS Number: 36734-19-7
Trade name(s): Rovral 4F, RP 26019, Glycophene, Chipco 26019, LFF 2043, NCR 910, ROP 500F.
Structure:



Molecular Formula: $C^{13}H^{13}Cl^{2}N^{3}O^{3}$
Molecular Weight: 330.15 g/mol

Physical/chemical Properties of the Active Ingredient:

Physical state: Non-hygroscopic crystals.
Color: White
Odor: Odorless
Solubility at 20 °C: 13 mg/L water; 300 mg/L acetone, acetophenone, anisole; 500 g/L methylene chloride, dimethylformamide, 1-methyl-2-pyrrolidone; 25 g/L ethanol, methanol; 200 mg/L benzene.
Melting Point: ca. 136 °C
Vapor Pressure at 20 °C: $< 1.0 \times 10^{-5}$ mm Hg (< 0.133 mPa)

Formulations:

Active Ingredient:
3-(3,5-dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazolidinecarboxamide.....50%
Inert Ingredients.....50%

2. **TEST MATERIAL:**

Phenyl-^{14}C-Iprodione (Specific activity of 10.5 μCi/mg and average purity of 99.2%).

2

3. **STUDY/ACTION TYPE**:

Review of an Aerobic Aquatic Metabolism study (#162-4).

4. **STUDY IDENTIFICATION**:

Letter from Mr. Nick Somma -- Registration Manager, Rhône-Poulenc Agricultural Company -- submitting an Aerobic Aquatic Metabolism study (Copy of the letter is attached to this review).

Spare, W.C. May 11, 1989. **Aerobic Aquatic Metabolism of Iprodione.** Agrisearch Project No. 1509. Unpublished study performed by Agrisearch Incorporated, Frederick, MD, and submitted by Rhône-Poulenc AG Company, Research Triangle Park, NC. (MRID #416002-01)

5. **REVIEWED BY**:

María Isabel Rodríguez
Chemist
Review Section #2
EFGWB/EFED/OPP/EPA

Signature: María Isabel Rodríguez

Date: November 9, 1990.

6. **APPROVED BY**:

Emil Regelman
Supervisory Chemist
Review Section #2
EFGWB/EFED/OPP/EPA

Signature: E Reg Ruan

Date: NOV 26 1990

7. **CONCLUSIONS**:

The following conclusions were drawn from the submitted Aerobic Aquatic Metabolism study:

1. The submitted study is unacceptable and cannot be used to fulfill the environmental-fate data-requirements.

2. The data are considered to be of uncertain value and should not be used to predict the environmental behavior of iprodione and its degradates. The analytical method used (one-dimensional TLC with two different solvent systems) was inadequate to resolve the degradates; up to 37% of the applied radioactivity did not migrate from the origin, and concentration data for degradates in the test water did not agree between the two TLC solvent systems used.

3. If samples of the soil extracts and test water are still available, these samples may be re-analyzed using an adequate analytical procedure and the data could be re-evaluated. Freezer storage stability data for these samples should also be submitted, if available.

4. [^{14}C]-Iprodione (radiochemical purity 99.2%), at 5.9 ppm, degraded with a half-life of 9 days in an aerobic paddy water:silt loam

sediment system incubated in the dark at 25 °C for up to 30 days. At 1 day post-treatment, parent iprodione in water ranged from 30.77-61.16% of the applied, decreasing to 0.95-1.21% by day 30. In aerobic sediment, parent iprodione was 5.47-9.94% of the applied at day 1, increased to a maximum of 30.39-37.84% by day 7, and decreased to 3.94-6.43% by day 30 post-treatment. Degradates detected were the following:

RP 36221	⟹	Present at a maximum of 3.26-3.56% of the applied at day 3 in solvent system 1, and at a maximum of 12.94-16.80% of the applied at day 1 in solvent system 2.
3,4-dichloroaniline	⟹	Present at a maximum of 1.51% of the applied at day 2 in solvent system 1.
RP 30228	⟹	Present at a maximum of 70.66-73.25% of the applied at day 30.

Origin material was a maximum of 23.43-36.90% of the applied at day 1. Unidentified "remainder" material accounted for up to 4.00% of the applied at 3 days post-treatment. Unextractable [^{14}C]-residues in sediment were 0.76-2.10% at day 1, increasing to a maximum of 8.96-9.15% by day 30 post-treatment. Cumulative volatiles were 0.78-1.21% at 30 days post-treatment.

During the study, material balances ranged from 97.46 to 114.20% of the initial radioactivity in the aerobic system, and from 99.35 to 102.37% in the sterile system (Table V of the study -- included in this review).

8. <u>RECOMMENDATIONS</u>:

The following information should be given to the registrant, Rhône-Poulenc Agricultural Company:

1. The submitted Aerobic Aquatic Metabolism study is unacceptable and cannot be used to fulfill the environmental-fate data-requirements.

2. The data are considered to be of uncertain value and should not be used to predict the environmental behavior of iprodione and its degradates. The analytical method used (one-dimensional TLC with two different solvent systems) was inadequate to resolve the degradates; up to 37% of the applied radioactivity did not migrate from the origin, and concentration data for degradates in the test water did not agree between the two TLC solvent systems used.

3. If samples of the soil extracts and test water are still available, these samples may be re-analyzed using an adequate analytical procedure and the data could be re-evaluated. Freezer storage stability data for these samples should also be submitted, if available.

9. BACKGROUND:

A. Introduction:

The general use-pattern for iprodione is aquatic food-crop and the environmental-fate data-requirements (according to 40 CFR, Part 158.290), and their status, are the following:

Data Requirement and Guidelines Reference #	Status
1. Degradation studies - lab	
a. Hydrolysis (161-1)	Fulfilled
b. Photodegradation in Water (161-2)	Fulfilled
2. Metabolism studies - lab	
a. Anaerobic aquatic (162-3)	Supplemental
b. Aerobic aquatic (162-4)	Required[1]
3. Mobility studies	
-Leaching and adsorption/desorption (163-1)	Fulfilled
4. Dissipation studies - field	
a. Aquatic (sediment) (164-2)	Required
b. Soil, long-term (164-5)	Reserved[2]
5. Accumulation studies	
a. Rotational crops	
-Confined (165-1)	Required
-Field (165-2)	Supplemental
b. Irrigated crops (165-3)	Required
c. In fish (165-4)	Fulfilled

1 This review.
2 Required if pesticide residues do not readily dissipate in soil.

B. Directions for Use:

Iprodione is a contact fungicide active against a broad spectrum of diseases including Botrytis, SclerotinIa, Monilinia, Alternaria, Helminthosporium, Fusarium, and Rhizoctonia. According to the label, it is registered for use on field and vegetable (lettuce, broccoli, carrots, onions, garlic, beans, peanuts, potatoes, caneberries, and ginseng) and orchard (apricots, cherries, nectarines, peaches, plums, prunes, almonds, and grapes) crops. The maximum application rates are 4.0 lb ai/A on ffield and vegetable crops and 2.0 lb ai/A on orchard crops.

10. DISCUSSION OF INDIVIDUAL STUDIES:

Refer to attached Data Evaluation Records (DER's).

11. COMPLETION OF ONE-LINER:

The one-liner data-base was updated with this review.

12. **CBI APPENDIX**:

The submitted study is considered "confidential business information" by the registrant and must be treated as such.

DP BARCODE: D155478

CASE: 002908 DATA PACKAGE RECORD DATE: 09/10/
SUBMISSION: S381704 BEAN SHEET Page 1 of

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REGISTRATION ACTION: COND REG FOLLOW-UP DATA REQ HED REVIEW
CHEMICAL:
ID#: 000264-00453 ROVRAL FUNGICIDE
COMPANY: 000264 RHONE-POULENC AG COMPANY
PRODUCT MANAGER: 32 SUSAN LEWIS 703-557-1900 ROOM: CM-2 227
PM TEAM REVIEWER: JAMES STONE 703-557-7391 ROOM: CM-2 247
RECEIVED DATE: 08/27/90 DUE OUT DATE: 12/15/90

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 155478 EXPEDITE: N DATE SENT: 09/10/90 DATE RET.: / /
DP TYPE: 001 Submission Related Data Package
ADMIN DUE DATE: 11/19/90 CSF: N LABEL: N

ASSIGNED TO	DATE IN	ASSIGNED TO	DATE IN
DIV : EFED	09/12/90	REVR :	/ /
BRAN: EFGB	/ /	CONTR:	/ /
SECT:	/ /		

* * * DATA PACKAGE REVIEW INSTRUCTIONS * * *

aerobic aquatic metabolism conditional requirment for use on rice

THERE ARE NO ADDITIONAL DATA PACKAGE RECORDS

109801 Iprodione

90-0867

Maria
11/19

IPRODIONE

Table of Contents

IPRODIONE ADDENDUM

Task 1: Review and Evaluation of Individual Studies

Contract No. 68D90058

Submitted to:
Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
The Dynamac Building
11140 Rockville Pike
Rockville, MD 20852

INTRODUCTION

Iprodione is a contact fungicide active against a broad spectrum of diseases including Botrytis, Sclerotinia, Monilinia, Alternaria, Helminthosporium, Fusarium, and Rhizoctonia. According to the label, it is registered for use on field and vegetable (lettuce, broccoli, carrots, onions, garlic, beans, peanuts, potatoes, caneberries, and ginseng) and orchard (apricots, cherries, nectarines, peaches, plums, prunes, almonds, and grapes) crops. The maximum application rates are 4.0 lb ai/A on field and vegetable crops and 2.0 lb ai/A on orchard crops.

DATA EVALUATION RECORD

STUDY 1

CHEM 109801 Iprodione §162-4

FORMULATION--WP

STUDY ID #416002-01

Spare, W.C. May 11, 1989. **Aerobic aquatic metabolism of iprodione.** Agrisearch Project No. 1509. Unpublished study performed by Agrisearch Incorporated, Frederick, MD, and submitted by Rhône-Poulenc AG Company, Research Triangle Park, NC.

DIRECT REVIEW TIME = 18

REVIEWED BY: C. Little TITLE: Staff Scientist

EDITED BY: K. Patten TITLE: Task Leader
T. Colvin-Snyder Staff Scientist

APPROVED BY: W. Spangler TITLE: Project Manager

ORG: Dynamac Corporation
Rockville, MD
TEL: 468-2500

APPROVED BY: María Isabel Rodríguez
TITLE: Chemist
ORGANIZATION: EFGWB/EFED/OPP/EPA

SIGNATURE: María Isabel Rodríguez

DATE: November 9, 1990.

CONCLUSIONS:

Metabolism - Aerobic Aquatic

1. The submitted study is unacceptable and cannot be used to fulfill the environmental-fate data-requirements.

2. The data are considered to be of uncertain value and should not be used to predict the environmental behavior of iprodione and its degradates. The analytical method used (one-dimensional TLC with two different solvent systems) was inadequate to resolve the degradates; up to 37% of the applied radioactivity did not migrate from the origin, and concentration data for degradates in the test water did not agree between the two TLC solvent systems used.

3. If samples of the soil extracts and test water are still available, these samples may be re-analyzed using an adequate analytical procedure and the data could be re-evaluated. Freezer storage stability data for these samples should also be submitted, if available.

METHODOLOGY:

Phenyl ring-labeled iprodione (radiochemical purity 99.2%, specific activity 10.5 μCi/mg, Rhône-Poulenc AG), dissolved in acetone, was added at 5.9 ppm to water (total alkalinity 22 mg/L, total hardness 72 mg/L, TSS 280 mg/L, pH 7.4) obtained from a rice paddy located at the LSU Rice Research Station in Crowley, Louisiana. The treated water samples were then added to flasks containing silt loam sediment (16% sand, 61% silt, 23% clay, 2.0% organic matter, pH 6.4, CEC 8.8 meq/100 g) obtained from the same paddy. The flasks were wrapped in foil and stoppered with polyurethane foam plugs. The flasks were flushed continuously during the day with compressed breathing air (flow rate 40-60 mL/min); flasks designated for the 1-month sampling were connected to a series of volatile traps containing ethylene glycol, sulfuric acid, and potassium hydroxide (Figure 2 of the study -- included in this review). The flasks were incubated at 25 ± 1 °C. Duplicate flasks were removed for analysis at 0, 1, 2, 3, 7 and 14 days, and 1 month post-treatment; trapping solutions were collected and replaced at each sampling interval.

The water was decanted from each sample and centrifuged, and the sediment pellet was returned to the sediment fraction. Duplicate aliquots of water and trapping solution samples were analyzed for total radioactivity using LSC; subsamples of the sediment were analyzed in duplicate by LSC following combustion. To identify degradates, aliquots of the centrifuged water from samples taken prior to day 7 were analyzed directly by TLC; samples from days 7-30 were acidified with KH_2PO_4 (pH 2) and partitioned three times with methylene chloride:ethyl acetate (9:1, v:v). Extracts from all sampling intervals were dried with anhydrous sodium sulfate, combined, concentrated by rotary evaporation, and analyzed by one-dimensional TLC on silica gel plates developed with either toluene:ethyl acetate (1:1, v:v) or toluene:ethyl acetate:acetic acid (80:15:5, v:v:v). Extracts were overspotted with unlabeled parent

iprodione and co-chromatographed with reference standards. Radioactive zones on the plates were visualized by UV light (254 nm) and scanned with a linear analyzer. Sediment samples were extracted twice with acetone:methanol:water:HCl (50:40:10:0.2, v:v:v:v) by sonication; sediment was removed by vacuum filtration and air-dried. The extract was filtered, and the filtrate was analyzed by LSC and TLC as described above. Unextractable [^{14}C]-residues were quantified by LSC following combustion.

To characterize unextracted residues remaining in the soil after the initial extraction, day 30 sediment samples were refluxed for 2 hours with acetone:methanol:water:HCl (50:40:10:0.2, v:v:v:v). The reflux extract was acidified with 0.05 M KH_2PO_4, and the organic solvents were removed by rotoevaporation. The aqueous phase was partitioned three times with methylene chloride:ethyl acetate (9:1, v:v), and the resulting extract was filtered and analyzed by LSC and TLC as described above.

To confirm the recoveries of parent and to characterize radioactive zones identified through one-dimensional TLC analysis, sediment and water extracts from the 1-month aerobic samples were analyzed using two-dimensional TLC developed with toluene:ethyl acetate (90:10, v:v) in the first direction and methylene chloride:ethyl acetate:formic acid (85:15:5, v:v:v) in the second direction. Radioactive zones were visualized as described above and located with autoradiography; zones were scraped from the plates and analyzed using LSC.

Selected water and sediment samples were analyzed by GC with electron-capture detection.

DATA SUMMARY:

[^{14}C]-Iprodione (radiochemical purity 99.2%), at 5.9 ppm, degraded with a half-life of 9 days in an aerobic paddy water:silt loam sediment system incubated in the dark at 25 °C for up to 30 days (Table X of the study -- included in this review). At 1 day post-treatment, parent iprodione in water ranged from 30.77-61.16% of the applied, decreasing to 0.95-1.21% by day 30 (Tables VI and VII of the study -- included in this review). In aerobic sediment, parent iprodione was 5.47-9.94% of the applied at day 1, increased to a maximum of 30.39-37.84% by day 7, and decreased to 3.94-6.43% by day 30 post-treatment (Tables VIII and IX of the study -- included in this review). Degradates detected were the following:

RP 36221	⟶	Present at a maximum of 3.26-3.56% of the applied at day 3 in solvent system 1, and at a maximum of 12.94-16.80% of the applied at day 1 in solvent system 2.
3,4-dichloroaniline	⟶	Present at a maximum of 1.51% of the applied at day 2 in solvent system 1.
RP 30228	⟶	Present at a maximum of 70.66-73.25% of the applied at day 30.

Origin material was a maximum of 23.43-36.90% of the applied at day 1. Unidentified "remainder" material accounted for up to 4.00% of the applied at 3 days post-treatment. Unextractable [^{14}C]-residues in sediment were 0.76-2.10% at day 1, increasing to a maximum of 8.96-9.15% by day 30 post-treatment. Cumulative volatiles were 0.78-1.21% at 30 days post-treatment.

During the study, material balances ranged from 97.46 to 114.20% of the initial radioactivity in the aerobic system, and from 99.35 to 102.37% in the sterile system (Table V of the study -- included in this review).

COMMENTS:

1. a. The one-dimensional TLC systems used in this study to analyze the majority of samples were unable to adequately resolve the radioactive material. Up to 33.33% of the applied in solvent system 1, and 36.90% in solvent system 2 remained at the origin as unidentified material; the high concentrations of uncharacterized material occurred early in the experiment (days 1 and 2). When the water from day 2 was analyzed using two-dimensional TLC, the concentration of [^{14}C]-residues remaining at the origin decreased to 0.22% of the applied and three degradates that had not been detected using one-dimensional TLC were resolved.

b. Also, TLC data for test water did not agree between the two solvent systems used. For example, in solvent system 1, origin material at day 3 posttreatment was 12.58-19.06% of the applied; in solvent system 2, origin material at day 3 accounted for 0.00-0.62% of the applied. At day 1 post-treatment in solvent system 1, parent material accounted for 48.16-61.16%; in solvent system two, parent material at day 1 accounted for 30.77-47.13%. It cannot be determined from the data provided whether either solvent system is preferable; neither of the two were capable of adequately resolving the extracted material into distinct zones of degradates.

2. Three degradates, detected at 2.96-7.92% of the applied on the two-dimensional TLC plate used to analyze the day 2 water sample, were not identified.

3. The analytical method was changed in the middle of the experiment without evidence from the study author that the change would not significantly affect the results. Extracts of paddy water from days 0-3 post-treatment were analyzed by TLC directly without concentration; subsequent samples were concentrated prior to TLC analysis. The study author failed to provide data showing that the concentration step did not significantly affect the results. The use of both techniques to analyze samples from the same sampling interval, in order to show any differences due to method, would have been sufficient.

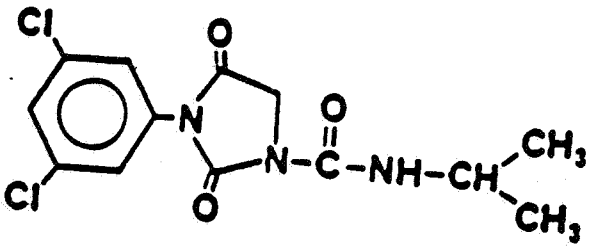
4. The study author reported separate half-lives for parent iprodione in the water and sediment portions of the test system, in addition to an overall half-life. However, because other processes, such as adsorption and desorption, can be expected to occur in such a system and have an

effect on the relative distribution of the test compound within the system, the separate half-lives are of little value. In this study, the test substance was shown to "partition readily from the water to the sediment." In addition, the registrant-calculated half-life for iprodione in paddy water was reported as 5 days; however, this does not accurately describe the observed half-life of approximately 1 day (based on the data in Table X).

5. Although a set of flasks containing sterile sediment/water systems was set up, the only data provided were for the material balance at 30 days posttreatment (Table V). No data for the characterization of residues in sterile samples were provided.

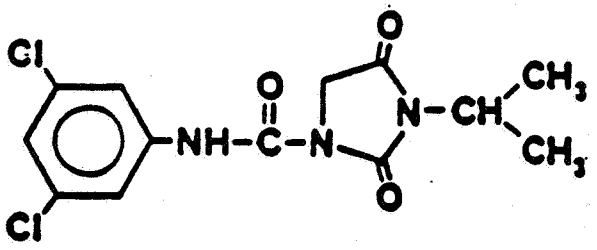
APPENDIX

STRUCTURES OF IPRODIONE AND ITS METABOLITES



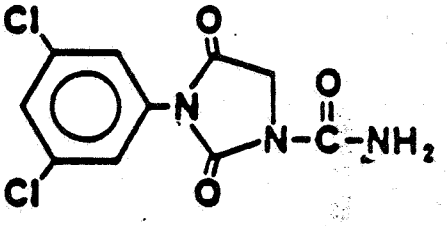
3-(3,5-Dichlorophenyl)-1-isopropyl-aminocarbonyl-2,4-dioxoimidazolidine

(Iprodione, RP-26019)



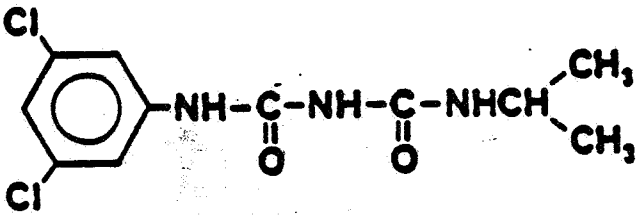
1-(3,5-Dichloroanilino)carbonyl-3-isopropylamino-2,4-dioxoimidazolidine

(RP-30228)

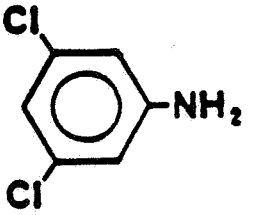


3-(3,5-Dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide

(RP-32409)



RP-36221



RP-32596

ATTACHMENTS

ATTACHMENT #1

Letter from Mr. Nick Somma

RHÔNE-POULENC

RHÔNE-POULENC AG COMPANY

August 24, 1990

Ms. Susan Lewis
Product Manager (21)
Environmental Protection Agency
Office of Pesticide Programs
Crystal Mall, Building 2
Arlington, Virginia 22202

Dear Ms. Lewis:

SUBJECT: Rovral-EPA Reg. No. 264-453
Rovral 4F-EPA Reg. No. 264-482
Conditional Registration on Rice

On July 13, 1989 the Agency issued the Conditional Registration of subject products on rice. One of the terms of this Conditional Registration was that Rhone-Poulenc would submit a new aerobic aquatic metabolism study. To satisfy this condition, attached are 3 copies of the following:

Volume 1 of 2: Transmittal Document

Volume 2 of 2: Aerobic Aquatic Metabolism Study of Iprodione. William C. Spare. Agrisearch Incorporated. May 11, 1990. Study Number 1509.

If you have any questions or if any further information is needed, please let me know.

Sincerely,

Nick Somma
Registration Manager

PO BOX 12014, 2 TW ALEXANDER DRIVE
RESEARCH TRIANGLE PARK, N.C. 27709
(919) 549-2000
INTERNATIONAL TELEX NUMBER 4999378–ANSWERBACK APC RTP
INTERNATIONAL DISTRIBUTION SERVICES TELEX NUMBER 4999377–ANSWERBACK APC IDS

20

Attachment #1

ATTACHMENT #2

Information obtained from the study.

PIN 5721-93

Iprodione EF Reviews

Page_____ is not included in this copy.

Pages 22 through 33 are not included.

The material not included contains the following type of information:

____ Identity of product inert ingredients.

____ Identity of product impurities.

____ Description of the product manufacturing process.

____ Description of quality control procedures.

____ Identity of the source of product ingredients.

____ Sales or other commercial/financial information.

____ A draft product label.

____ The product confidential statement of formula.

____ Information about a pending registration action.

✓ FIFRA registration data.

____ The document is a duplicate of page(s) _____.

____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.
