DP Barcode: 171984, 180541
Shaughnessy No.: 109801
Date Out of EFGWB:

TO: Barbara Briscoe, Chemical Review Manager
Accelerated Reregistration Branch
Special Review and Registration Division (H7508W)

FROM: Emil Regelman, Supervisory Chemist
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division (H7507C)

THROUGH: Henry Jacoby, Chief
Environmental Fate and Groundwater Branch
Environmental Fate and Effects Division (H7507C)

Attached, please find the EFGWB review of:

Reg./File #(s) : 109801-264

Common Name : Iprodione

Chemical Name : 3-(3,5-Dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazolidinecarboxyamide

Product Type : Fungicide

Product Name : Glycophene, Rovral 4F, RP 26019, Chipco 26019, others

Company Name : Rhone-Poulenc Agricultural Company

Purpose : Review of Field Dissipation, and Adsorption/Desorption studies; waiver request for the Long Term Field Diss. study; review of Aquatic Field Dissipation, and Accumulation in Irrigated Crops studies; review of Addendum to 161-2; request for Approval of a [^{14}C] labeling site

Action Code: 606/614/604/627 EFGWB #(s): 92-0320/1148/0555/0653

EFGWB Guideline/MRID/Status Summary Table:
The review in this package contains...

161-1			162-4			164-4			166-1		
161-2	42201301 (addendum)	Y	163-1	41878801 41889601	N	164-5	Waiver	N	166-2		
161-3			163-2			165-1			166-3		
161-4			163-3			165-2			167-1		
162-1			164-1	41877401	S	165-3	00162218	S	167-2		
162-2			164-2	00162218	N	165-4			201-1		
162-3			164-3			165-5			202-1		

Y = Acceptable (Study satisfied the Guideline)/Concur P = Partial (Study partially satisfied the Guideline, but additional information is still needed)
S = Supplemental (Study provided useful information, but Guideline was not satisfied) N = Unacceptable (Study was rejected)/Non-Concur

1. CHEMICAL:

Common name:

Iprodione.

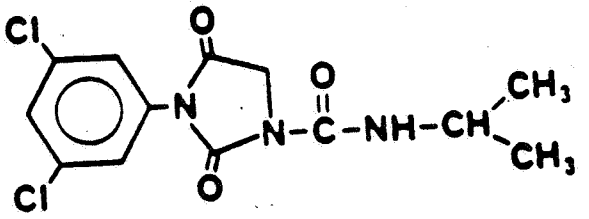
Chemical name:

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

Trade name(s):

Chipco 26019, Kidan, Rovral, RP-26019.

Structure:



Formulations:

Wettable powder, flowable concentrate.

Physical/Chemical properties:

Molecular formula:	$C_{13}H_{13}Cl_2N_3O_3$
Molecular weight:	330.2 g/mole
Physical state:	White, odorless, non-hygroscopic crystals
Melting point:	c. 136°C
Vapor pressure (20°C):	<0.133 mPa (<9.98×10^{-7} torr)
Solubility (20°C):	13 mg/L water; 200 g/L benzene; 300 g/L acetone, acetophenone, anisole; 500 g/L methylene chloride, dimethylformamide, 1-methyl-2-pyrrolidone; 25 g/L ethanol, methanol

2. TEST MATERIAL:

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

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3. STUDY/ACTION TYPE:

Review of Adsorption/Desorption, Field Dissipation, Aquatic Field Dissipation, Accumulation in Irrigated Crops, and Leaching studies, evaluation of waiver request for the Long Term Field Dissipation (164-5) data requirement; review of Addendum to 161-2; requests for approval of [^{14}C] labeling site.

4. STUDY IDENTIFICATION:

Adrian, P. P., and Robles, J. 1992. ^{14}C-Iprodione Aqueous Photolysis Addendum to MRID No. 41861901. Study No. 90-22. Unpublished study submitted by Rhone-Poulenc Ag Company (MRID# 42201301)

Doble, M.L., J.R. Outram, and G.L. Reeves. 1991. Iprodione-^{14}C: Aged leaching study with four soils. Laboratory Project ID: P91/050. Unpublished study performed by Rhone-Poulenc Agricultural Ltd., Essex, England, and submitted by Rhone-Poulenc Ag Company, Research Triangle Park, NC. (41889601)

Gemma, A. A., Heinzelmann, G. F., and Wargo, J. P. 1986. Iprodione aquatic field dissipation and field irrigated crop study. ASD Report No. 861196 and Lab. Ref. No.86/BHL/326/AG. Unpublished study performed by Agrisearch Incorporated, MD, and submitted by Rhone-Poulenc Inc., NJ (MRID# 00162218)

Jordan, E. G. 1991. Response to EPA FIFRA 88 Phase 4 Data Call-In on Iprodione Case #2335 Chemical #109801 - Request for Doing Aerobic Soil Metabolism Study with Iprodione Labeled in the Phenyl Ring Only. Reference No. EGB-BF-1227-1. Unpublished study submitted by Rhone Poulenc Ag Company, NC (MRID# 42169303)

Jordan, E. G. 1991. Response to EPA FIFRA 88 Phase 4 Data Call-In on Iprodione Case #2335 Chemical #109801 - Request for Doing Fish Bioaccumulation Study with Iprodione Labeled in the Phenyl Ring Only. Reference No. EGB-BF-1227-1. Unpublished study submitted by Rhone Poulenc Ag Company, NC (MRID# 42169304)

Norris, F.A. 1991. A terrestrial field soil dissipation study with iprodione. Study No. EC/P-89-0013. File No. 40644. Unpublished study performed and submitted by Rhone-Poulenc Ag Company, Research Triangle Park, NC. (41877401)

Outram, J.R., G.L. Reeves, and E.M. Smith. 1991. Iprodione-^{14}C: Adsorption/desorption on four soils. Laboratory Project ID: P91/049. Unpublished study performed by Rhone-Poulenc Agriculture Limited, Essex, England, and submitted by Rhone-Poulenc Ag Company, Research Triangle Park, NC. (41878801)

5. REVIEWED BY:

José Luis Meléndez
Chemist
EFGWB/EFED/OPP
Review Section #2

Signature: José Luis Meléndez

Date: Dec. 23, 1992

6. APPROVED BY:

Emil Regelman
Chief
EFGWB/EFED/OPP
Review Section #2

Signature: Elg

Date: 1/4/94

7. CONCLUSIONS:

- **Mobility - Batch Equilibrium (MRID# 41878801)**

This study cannot be used to fulfill the unaged portion of the data requirement because of the rapid (unexplained) breakdown of iprodione in three of the four soils tested. In the sand, sandy loam 2, and loam soils, iprodione accounted for ≤3.0% of the total radioactivity. The radioactivity measured was attributed to one major, and one or two minor unidentified degradates.

The problems with this study cannot be resolved by the submission of additional data. A new study is required.

The registrant used the batch equilibrium method to assess the mobility of the parent iprodione in four soils. According to the registrant, since the soil was sterilized with sodium azide, and the experiment was conducted in the dark, the major route of degradation was hydrolysis. The hydrolysis study of iprodione shows that the reaction is strongly pH dependent; however, the pH of the slurries was not reported. From the information provided it cannot be determined if the degradation was really caused by hydrolysis or other mechanism.

The registrant must attempt to determine the reasons for the rapid breakdown of iprodione in this system. The registrant should design and conduct an experiment to assess the mobility of parent iprodione that avoids the problems found with the original studies, using the appropriate soil types. If it is determined that iprodione is labile under batch equilibrium conditions, the registrant should consider the alternative of using a soil column leaching procedure.

[^{14}C]iprodione (uniformly phenyl ring-labeled), was mobile in sand, loam, and two sandy loam soil:calcium chloride solution slurries (2.5:10) equilibrated in the dark for 6 hours at about 20°C. Concentrations of iprodione ranged from 0.05 to 5.0 ug/mL, with reported Freundlich K_{ads} values from 1.56 to 11.66. The K_{oc} values ranged from 373 to 1551. Following the first desorption step,

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Freundlich K_{des} values ranged from 4.72 to 15.83 for the four soil types.

● Mobility - Column Leaching of Aged Residues (MRID# 41889601)

This study cannot be used to fulfill data requirements for the following reasons:

- The data are of uncertain value. Results of the three analytical methods were inconsistent with each other, both quantitatively and qualitatively. For example, in the 0-6 cm segment, the concentration of RP-36221 ranged from 0 to 23.04% in the sand soil, and the concentration of RP-32596 ranged from 9.27 to 46.65% in the loam soil. The number of degradates in the soil could not be accurately determined. This number ranged from 4 to 7.
- According to Subdivision N Guidelines the test substance should be aged for 30 days or one half-life, whichever is shorter. The test substance was aged longer than one half-life (half-life estimated by authors of the study 7-11 days, aging period 24 days), with less than 25% of [^{14}C] iprodione remaining at the initiation of leaching.

The problems with this study cannot be resolved with the submission of additional data. A new study is required. The registrant should repeat the study using an aging period of 30 days or one half-life, whichever is shorter. Based on the measurements made by the registrant on these soils, the aging period should be 7-11 days. The registrant should also develop a reliable methodology for the identification and quantitation of the metabolites in soil.

[^{14}C] Iprodione (uniformly phenyl labeled) residues were mobile in sand and slightly mobile in sandy loam, and loam soil leaching columns. Soils were treated at an application rate of approximately 5 kg ai/ha, then aged for 24 days in the dark at 20±2°C and 75% field moisture capacity.

In the soil columns 42.6-85.0% of the applied radioactivity was recovered from the 0-6 cm depth, 7.7-15.6% from the 6-12 cm depth, 0.9-12.1% from the 12-18 cm depth, <0.5-8.0% from the 18-24 cm depth, <0.5-5.4% from the 24-30 cm depth. [^{14}C] Residues in the leachate totaled 0.2-15.5% of the applied.

The following degradates were identified from the Soil extracts from the column segments:

3,4-dichloroaniline (RP-32596);
3-(1-methylethyl)-N-(3,5-dichlorophenyl)-1-ureylenecarboxamide (RP-36221);
1-(3,3-dichlorophenyl) carbamoyl-3-isopropylhydantoin (RP-30228);
3,4-dichloroaniline (RP-32596);
dichlorophenol;
and 1-(3,5-Dichlorophenyl)-3-hydantoin (RP-25040).

Various other metabolites were not identified. (Refer to attachement for chemical structure of iprodione metabolites).

- **Field Dissipation Study (MRID# 41877401)**

This study is acceptable and provides supplemental information to fulfill the Terrestrial Field Dissipation data requirement. No additional information is required at this time. EFGWB believes, however, that Metabolism Studies are required to confirm the adequacy of this study. Therefore, EFGWB will defer the final decision on the adequacy of the Field Dissipation Study until metabolism studies are submitted and evaluated.

In the study conducted in California, iprodione dissipated with a half-life of about 7 days in the 0 to 15 cm depth in soil treated with eight weekly applications of the chemical. Iprodione was 0.66 ppm immediately after the last application. The level decreased to 0.32 ppm by 7 days. Iprodione was recovered from the 15 to 30 cm depth at ≤0.07 ppm in all sampling intervals. Iprodione was not detected below this depth at any sampling interval.

3-(1-Methylethyl)-N-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide (RP-30228) was the degradate detected at a maximum of 0.47 ppm at 28 days after the eighth application in the 0 to 15 cm depth and declined to 0.15 ppm at 538 days after that application. In the 15 to 30 cm depth, RP-30228 was detected at ≤0.06 ppm at all sampling intervals. This degradate was not detected at any sampling interval below 30 cm soil sampling depth. The second degradate, 3-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide (RP-32490), was detected at ≤0.09 ppm in the 0 to 15 cm depth, and was not detected at any sampling interval in the deeper soil depths.

In the study conducted in North Carolina, iprodione dissipated from the upper 0 to 15 cm depth with an observed half life of less than 3 days and a 50% dissipation time of 0.35 days, calculated by nonlinear regression. Iprodione ranged from 0.22 to 0.74 ppm immediately after each of the eight applications. Iprodione decreased to 0.05 ppm by 7 days and 0.01 ppm by 310 days; iprodione was not recovered after 310 days following the final application. No residues were found below the 0 to 15 cm depth.

In the 0 to 15 cm depth, the degradate, RP-30228 ranged from 0.01 to 0.08 ppm from immediately after the second application until 492 days after the eighth application. A second degradate, RP-32490, was detected at ≤0.06 ppm in the 0 to 15 cm soil depth. Neither degradate was detected below the 0 to 15 cm depth.

- **Request for a Waiver for the Long Term Field Dissipation (164-5) data requirement**

The registrant submitted a request for a waiver for the Long Term Field Dissipation (164-5) data requirement, based on results obtained in the previously submitted Field Dissipation studies (MRID# 41877401, refer to DER attached for details). The submission contains supplemental information of studies conducted in California and North Carolina. The available data is indicative of rapid (≤7 days) dissipation of iprodione and its degradates. EFGWB defers the decision on the request for a waiver for the Long Term Field Dissipation (164-5) data requirement at this time. The data requirement will be reserved until the results of the Field Dissipation Study are validated.

- **Review of Addendum to Photodegradation in Water (161-2) Study (MRID# 42201301)**

This addendum is acceptable and can be used to fulfill the Photodegradation in Water (161-2) data requirement by providing additional information to supplement the original study (MRID# 41861901). The Photodegradation in Water (161-2) data requirement is satisfied. No additional information is required.

[^{14}C] Iprodione (uniformly ring-labeled), applied at a concentration of 5 ppm, photodegraded with a registrant calculated half-life of 67 Florida equivalent days, and remained stable in the dark control solutions. The major degradates were (RP-30228) 1-(3,5-dichlorophenyl)carbamoyl-3-isopropylhydantoin with a maximum of 2.73% at 16.9 Florida equivalent days; and (RP- 40837) 1-isopropylcarbamoyl-3-(3,4-dichlorophenyl)hydantoin with a maximum of 2.75% at 4 days. This second degradate (RP-40837) was not observed in the Field Dissipation Study.

[^{14}C] Iprodione photodegraded with a half-life of 22 Florida equivalent days in solution sensitized by the addition of acetone at 2%. 1-Isopropylcarbamoyl-3-(3,4-dichlorophenyl)hydantoin (RP-40837) was the primary degradate observed.

- **Aquatic Field Dissipation (164-2) and Accumulation in Irrigated Crops (165-3) Studies (MRID# 00162218)**

A. Aquatic Field Dissipation:

This study was previously reviewed and found to be not acceptable (EAB# 60818, July 30, 1987). As per SACS Reregistration Summary Report for Phase IV (4/16/91), a new study is being conducted as part of the conditional registration on rice.

B. Accumulation in Irrigated Crops:

This portion of the study cannot be used to fulfill data requirements since the following data gaps exist:

freezer storage stability data
irrigation water flow
details of the extraction procedure used for the plant samples

The study may be made acceptable by the submission of additional data. In order to consider this study for the fulfillment of the data requirement, the above mentioned data gaps should be addressed by the submission of additional data.

1-(3,5-dichloroanilino)carbonyl-3-isopropylamine-2,4-dioxoimidazolidine (RP-30228), 3-(3,5-Dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide (RP-32490), and iprodione were not detected (<0.05 ppm) in sorghum (whole plant), soybeans (seeds, pods, trash), sweet potatoes (roots), cotton (whole plant, bolls), or soil (0-8, 8-16 cm depths) irrigated with water from flooded plots of silt loam soil planted to rice. The rice was treated twice with iprodione (Rovral 50%) at 0.50 lb ai/A. The concentrations of Iprodione, RP-30228, and RP-32490 in the irrigation water were 0.13, 0.07, and 0.08 ppm, respectively.

- **Request for Approval of a [^{14}C] labeling site for the Bioaccumulation in Fish (165-4) and the Aerobic Soil Metabolism (162-1) studies.**

EFGWB concurs with the request for approval of the [^{14}C] labeling in the phenyl ring of iprodione for the Bioaccumulation in Fish and the Aerobic Soil Metabolism studies since the imidazole ring of the molecule is labile (please, refer to section 10).

8. RECOMMENDATIONS:

1. Inform the registrant that the Mobility and Adsorption/Desorption (163-1) studies (MRID# 41878801 and 41889601) are not acceptable. New unaged and aged Mobility and Adsorption/Desorption studies should be submitted. The registrant is advised to design an experiment that avoids the problems found with the original studies. The registrant should also develop more reliable methodologies for the quantitation and identification of metabolites.

2. Inform the registrant that the Terrestrial Field Dissipation (164-1) study (MRID# 41877401) is acceptable and fulfills this data requirement. No additional data is required at this time. EFGWB believes, however, that Metabolism Studies are required to confirm the adequacy of this study. Therefore, EFGWB will defer the final decision on the adequacy of the Terrestrial Field Dissipation Study until metabolism studies are submitted and evaluated.

3. Inform the registrant that EFGWB defers the decision on the request for a waiver for the Long Term Field Dissipation (164-5) data requirement at this time. The data requirement will be reserved until the results of the Field Dissipation Study are validated.

4. Inform the registrant that the Photolysis in Water (161-2) studies (MRID# 41861901 and addendum 42201301) are acceptable and fulfill the data requirement. No additional data is required.

5. Inform the registrant that the Aquatic Field Dissipation (164-2) study (MRID# 00162218) is not acceptable. This study is being repeated as per terms of the conditional registration on rice.

6. Inform the registrant that the Accumulation in Irrigated Crops (165-3) study (MRID# 00162218) is considered supplemental at this time. The study may be made acceptable with the submission of following additional data: freezer storage stability data, irrigation water flow, and details of the extraction procedure used for the plant samples. If the registrant cannot provide this information or if the information provided is unacceptable, a new study must be conducted.

7. Inform the registrant that EFGWB concurs with the request of the registrant to conduct the Bioaccumulation in Fish (165-4) and the Aerobic Soil Metabolism (162-1) studies using [^{14}C] iprodione labeled in the phenyl ring only.

9. BACKGROUND:

Iprodione is a contact fungicide active against a broad spectrum of diseases including Cyliadrocladrim, Botrytis, Sclerotinia, Septoria, Monilinia, Alternaria, Helminthosporium, Fusarium, and Rhizoctonia. Iprodione is registered for the following use patterns: terrestrial food/feed/non-food, outdoor residential, aquatic food, and greenhouse non-food. It is used on vegetable (lettuce, broccoli, carrots, onions, garlic, beans, peanuts, potatoes, caneberries, and ginseng), orchard (grapes, berries, stone fruits, and almonds), cereal, ornamental, and turf crops. Single active ingredient formulations include wettable powder and flowable concentrate. The maximum application rates are 4.0 lb ai/A on field and vegetable crops, and 2.0 lb ai/A on orchard crops.

Two data packages were submitted to EFGWB containing a waiver request for the Long Term Soil Dissipation (164-5) data requirement, an addendum to a Photolysis in Water study and a request for approval of a ^{14}C labeling site for the Bioaccumulation in Fish (165-4). The following studies were also reviewed: Adsorption/Desorption, Soil Field, and Aquatic Field Dissipaton studies.

An Aquatic Field Dissipation study was previously reviewed (MRID# 00162218, EAB# 60818, July 30, 1987) and found to be not acceptable. Additional data was submitted and reviewed (EAB# 80464, June 24,1988). The additional data was found inadequate to resolve the issues raised in the former review. A new study was required to support the aquatic field dissipation data requirement. As per SACS Reregistration Summary Report for Phase IV (4/16/91), a new study is being conducted as part of the conditional registration on rice.

The protocol for an Accumulation in Irrigated Crops study was reviewed (EAB# 5787). The possible need of storage stability data for this study was addressed in the review. As per SACS Reregistration Summary Report for Phase IV (4/16/91), the Irrigated Crops (165-3) study (MRID# 00162218) was found reviewable, but the need for storage stability data was indicated.

An environmental-fate summary table for iprodione is attached to this review.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

Refer to attached Data Evaluation Records (DER's) for details of the individual studies.

- **Review of Addendum to Photolysis in Water Study (MRID# 41861901).**

The following comments were made in the Data Evaluation Record for the original study (EFGWB# 91-0712/0725/0726) and were considered data gaps. Responses from the registrant, and a brief discussion of each one are also provided.

1. "Sampling intervals for irradiated and dark control test solutions were reported in terms of equivalent Florida summer sunlight rather than the actual post-treatment sampling intervals."

The registrant provided the actual sampling intervals (Tables I, II and III of the report). It is observed from the tables, that the posttreatment irradiation time was a maximum of 212.98 and 205.36 hours (about 8.9 days) for the non-sensitized solutions with intermittent and continuous flow, respectively. This is an equivalent to approximately 33 Florida days. For the photosensitized samples, the maximum irradiation time was 159.18 hours (approximately 6.6 days), which corresponds to about 24 Florida days.

EFGWB considers that this problem is resolved with the submission of the additional data.

2. "A measured total irradiant intensity of the artificial light source was not reported."

The registrant provided the intensities of the xenon arc lamp (Tables I, II, and III of this report). It is indicated that the light intensity was recorded at the level of the liquid surface in the reaction vessels with a variation from 267.55 up to 499.2 W/m^2 using a radiometer. According to the registrant the variation is due to the fact that two suntest apparatus were used. To standardize the results, the total irradiant intensity was converted to the Florida sunlight equivalent and reported by the registrant.

EFGWB considers that this problem is resolved with the submission of the additional data.

3. "The description of the methodology was vague and incomplete."

All missing details indicated in the Data Evaluation Record were provided by the registrant in this report. Several aspects of the test methodology were further described in this submitted report. The absorption spectrum of iprodione in pH 5 solution was provided.

EFGWB considers that this problem is resolved with the submission of the additional information.

4. "There are significant discrepancies in the formation of [^{14}C] volatiles between the reaction vessels that were periodically flushed with air versus continuous air flow."

According to the registrant, the continuous air flow experiment was performed to verify if there was an improvement in the radiochemical recovery rate since it was believed that a decrease of the radioactivity recovery rate during irradiation was due to a diffusion of volatile compounds through the plastic tubing. In the continuous air flow, up to about 24% of the applied radioactivity was found as volatiles (mainly $^{14}CO_2$). In contrast, in the intermittent air flow system, less than 1% of volatiles were found.

Authors of the report indicate that the formation of $^{14}CO_2$ in the continuous air flow samples appears to be related to the concentration of oxygen in contact with the irradiated solution possibly due to formation of hydroxylated compounds sensible to oxidation.

EFGWB considers that this item was not satisfactorily resolved. Low levels of volatiles were observed in the dark control of intermittent flow experiment as well as in the hydrolysis experiments. However, dark control data for the continuous flow experiment were not provided for comparison. These reactions could also be caused by the use of nonsterile solution in the continuous flow experiment.

The absorption spectrum of iprodione in pH 5 solution shows no absorption bands at wavelengths above 290 nm. Very little or no photodegradation is expected for this compound. This is confirmed by a relatively high photodegradation in water half-life observed in this study, of 67 Florida equivalent days. Despite the fact that item #3 above was not completely resolved, EFGWB considers this addendum acceptable to fulfill the photodegradation in water data requirement by providing additional information to supplement the original study (MRID# 41861901). No additional information is required.

- **Request for approval of a [^{14}C] labeling site for the Bioaccumulation in Fish and the Aerobic Soil Metabolism studies (MRID# 42169303 and 42169304)**

The registrant requested an approval to conduct the Bioaccumulation in Fish and the Aerobic Soil Metabolism studies using iprodione labeled in the phenyl ring only. EPA had previously requested studies to be conducted using iprodione labeled in the phenyl and the imidazole rings. The registrant indicates studies using the phenyl ring labeled compound would be sufficient to identify all iprodione metabolites because the phenyl ring is very stable, while the imidazole ring is labile. Studies previously submitted by the registrant were used as supporting data. Even though these previous studies cannot be used to fulfill any data requirements, they provide useful supplemental information.

In a bioaccumulation in Crayfish study (MRID# 0016222), the registrant reported a proposed degradation mechanism, based on the observed degradation products, in which the iprodione species isomerizes to 3-(1-methylethyl)-N-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidine-carboxamide (RP-30228), which is a product of the recyclization of the imidazole ring of iprodione, followed by the loss of isopropyl group and opening of the imidazole ring. Similarly, the registrant proposes a mechanism for the Aerobic Soil Metabolism. The major degradates are RP-30228, and other open ring compounds.

In addition to the studies cited by the registrant, the following data was obtained from the EFGWB files. The hydrolysis study (MRID# 41885401) shows that the two major degradates are RP-30228 and a product of the cleavage of the imidazole ring, 3-(3,5-dichlorophenyl)-N-(1-methylethyl)-ureylene carboxamide (RP-36221). Two previous aerobic aquatic metabolism and one anaerobic aquatic metabolism studies were conducted (MRID#'s 4192760, 41600201, and 41755801). In all cases the major non-volatile degradate was RP-30228 and only the phenyl ring was labeled.

Observations of the above mentioned studies indicate that the imidazole ring would be of lower concern in the identification of iprodione degradation products; therefore, EFGWB approves that the

Bioaccumulation in Fish and the Aerobic Soil Metabolism studies be conducted using the compound labeled in the phenyl ring only.

11. COMPLETION OF ONE-LINER:

The One-Liner database file for iprodione was updated with this review.

12. CBI APPENDIX:

All data reviewed here are considered "company confidential" by the registrant and must be treated as such.

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ENVIRONMENTAL FATE SUMMARY TABLE FOR IPRODIONE

Data Requirements and Guidelines Reference No.		Use Patterns [1]	Does EPA have data to satisfy this data requirement?	Bibliographic Citation	Additional Data Required?
Degradation - Lab.:					
161-1	Hydrolysis	A,B,C,D, I,K	Yes	41885401	No[2]
161-2	Photolysis in Water	A,B,C,D	Yes	41861901	No[3]
161-3	Photolysis in Soil	A,B,C	No		Yes[4]
161-4	Photodegradation in Air	A,B,C,I, K	No		Waived[5]
Metabolism Studies - Lab.					
162-1	Aerobic Soil Metabolism	A,B,C,D, I,K	No		Yes[6]
162-2	Anaerobic Soil Metabolism	A,B,C	No		Yes[7]
162-3	Anaerobic Aquatic Metabolism	A,B,C,D	No		Yes[8]
162-4	Aerobic Aquatic Metabolism	A,B,C,D	No		Yes[9]
Mobility Studies - Lab.					
163-1	Mobility in Soil	A,B,C,D I,K	No		Yes[10]
163-2	Volatility from Soil (Lab.)	A,B,I	No		Waived[5]
163-3	Volatility from Soil (Field)	A,B,I	No		Waived[5]
Field Dissipation Studies					
164-1	Terrestrial	A,B,C,D, K	Yes	41877401	Supplemental[11]
164-2	Aquatic/Sediment	A,B,C,D	No		Yes[12]
164-3	Forestry	N/A	N/A	N/A	N/A[13]

Data Requirements and Guidelines Reference No.		Use Patterns [1]	Does EPA have data to satisfy this data requirement?	Bibliographic Citation	Additional Data Required?
164-4	Combination/Tank Mixes	N/A	N/A	N/A	N/A[13]
164-5	Terrestrial (Long Term)	A,B,C,D, K	No		Reserved[14]
Accumulation Studies					
165-1	In Confined Rotational Crops	A,B,C,D	No		Yes[15]
165-2	In Field Rotational Crops	A,B,C,D	No		No[16]
165-3	In Irrigated Crops	D	No		Yes[17]
165-4	In Fish	A,B,C,D	No		Yes[18]
165-5	In Aquatic, Non-target Organisms	A,B,C,D	No		Reserved[19]
Other					
166-1/-2/-3	Ground Water Monitoring Studies	A,B,C	No		No[20]
167-1/-2	Run-off/Surface Water Monitoring Studies	A,B,C,D, K	No		No[20]

Footnotes:

1. Use patterns: A = Terrestrial Food Crop; B = Terrestrial Feed Crop; C = Terrestrial Non-Food; D = Aquatic Food; I = Greenhouse Non-Food; K = Outdoor residential

2. Iprodione hydrolyzed with half-lives of 131 days, 4.7 days, and 27 minutes in sterile aqueous buffered solutions at pH's of 5, 7, and 9, respectively (EFGWB 91-0712).

3. Iprodione photodegraded with a calculated half life of 67 Florida equivalent days (EFGWB# 92-1148).

4. Previous study found not acceptable (MRID# 41912101, EFGWB# 91-0719). A new study is required.

5. Photodegradation in air (161-4) and laboratory volatility studies (163-2) are required if the vapor pressure of the technical grade active ingredient is greater than 10^{-4} torr. The vapor pressure for iprodione is $<9.98 \times 10^{-7}$ torr, therefore, studies are not required.

6. Previous study found not reviewable (MRID# 00068285, Summary 92083022). A new study is required.

7. An Anaerobic Aquatic Metabolism (162-3) study may be used to satify this data requirement.

8. Previous study found not acceptable (MRID# 41755801, EFGWB# 91-0399, 5/13/92). A new study is required.

9. Two previous studies found not acceptable (MRID# 41927601, EFGWB# 91-0725/0726; and MRID# 41600201, EFGWB# 90-0867). A new study is required.

10. Previous studies found not acceptable (MRID#'s 41878801 and 41889601, EFGWB# 92-1148). New aged and unaged studies are required.

11. The information provided by previous study is supplemental. Iprodione dissipated with half-lives of about 7 days, and < 3 days in the 0-15 cm depth in soils of California and North Carolina. The main degradates are RP-30228 and RP-32490 (EFGWB# 92-1148). Decision of the adequacy of this study will be deferred until the registrant submits adequate metabolism studies.

12. Previous study found not acceptable (MRID# 00162218, EFGWB# 92-1148). A new study is being conducted as part of the conditional registration on rice.

13. N/A = Not Applicable

14. EFGWB does not concur with a request for a waiver for the Long Term Field Dissipation (164-5) data requirement based upon results of Field Dissipation studies conducted in California and in North Carolina. The data requirement will remain reserved until the Field Dissipation Study is validated.

15. Previous study found not acceptable (MRID# 41247101, EFGWB# 90-0373). A new study is required.

16. The Accumulation in Field Rotational Crops is now a data requirement of the Tolerance Support Chemistry Branch, of the Health Effects Division.

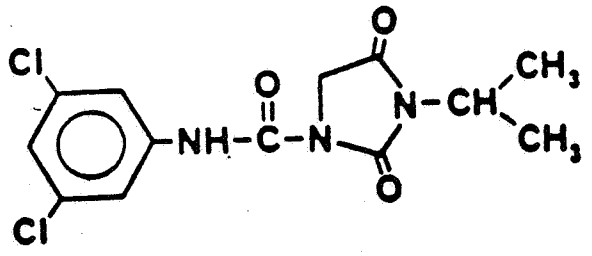
17. Previous study found not acceptable at this time (EFGWB# 92-1148, MRID# 00162218). The study <u>may</u> be made acceptable by the submission of additional data.

18. Previous studies found not reviewable (MRID#'s 00162221 00162222, Summary 92083024). A new study is required.

19. Reserved pending results of Accumulation in Fish (165-4) studies.

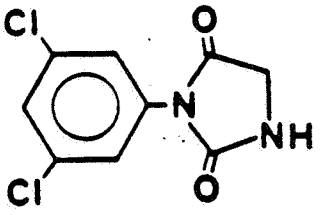
20. The Soil Field Dissipation studies indicate that iprodione is not persistant nor highly mobile, therefore, the Groundwater and the Run-off/Surface monitoring studies are not required.

CHEMICAL STRUCTURES

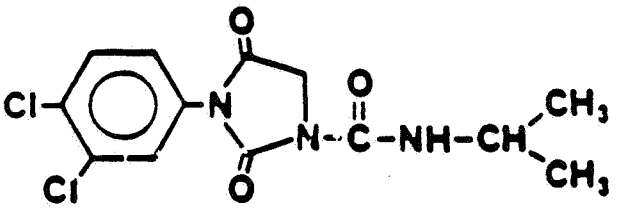


1-(3,5-Dichlorophenyl)carbamoyl-3-isopropylhydantoin

(RP-30228)

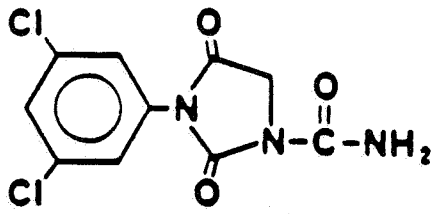


1-(3,5-Dichlorophenyl)-3-hydantoin
(RP-25040)



1-Isopropylcarbamoyl-3-(3,4-dichlorophenyl)hydantoin

(RP-40837)



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

Carbamoyl-1-(3,5-dichlorophenyl)-3-hydantoin

(RP-32490)

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
IPRODIONE
Last Update on December 23, 1992
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

LOGOUT	Reviewer:	Section Head:	Date: 12/23/92

Common Name:IPRODIONE
Smiles Code:
PC Code # :109801 CAS #:36734-19-7 Caswell #:

Chem. Name :3-(3,5-Dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-
1-imidazolidinecarboxamide
Action Type:FUNGICIDE

Trade Names:GLYCOPHENE; ROVRAL 4F; RP 26019; CHIPCO 26019; others.
(Formul'tn):50% WP or FC; Granular
Physical State: Non-hygroscopic crystals

Use :Terrestrial food/feed/non-food, outdoor residential, aquatic
Patterns :food, and greenhouse non-food.
(% Usage) :Vegetables (lettuce, broccoli, carrots, onions, & others),
:orchard (apricots, almonds, peaches, & others).

Empirical Form: $C_{13}H_{13}Cl_2N_3O_3$
Molecular Wgt.: 330.15 Vapor Pressure: 1.00E -7 Torr
Melting Point : ca. 136 oC°C Boiling Point: °C
Log Kow : 3.1 pKa: @ °C
Henry's : E Atm. M3/Mol (Measured) 3.34E -9 (calc'd)

Solubility in ...				Comments
Water	13.00E	ppm	@20.0 °C	
Acetone	3.00E 2	ppm	@20.0 °C	
Acetonitrile	E	ppm	@ °C	
Benzene	2.00E 2	ppm	@20.0 °C	
Chloroform	E	ppm	@ °C	
Ethanol	2.50E 4	ppm	@20.0 °C	
Methanol	2.50E 4	ppm	@20.0 °C	
Toluene	E	ppm	@ °C	
Xylene	E	ppm	@ °C	
Methylene chloride	5.00E 5	ppm	@20.0 °C	
Dimethylformamide	5.00E 5	ppm	@20.0 °C	

Hydrolysis (161-1)
[V] pH 5.0:131 DAYS
[V] pH 7.0:4.7 DAYS
[V] pH 9.0:1 DAY (For 1991 study: 27 MINUTES)
[V] pH 3.0:STABLE
[V] pH 6.0:20 DAYS
[ ] pH :

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
IPRODIONE
Last Update on December 23, 1992
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Photolysis (161-2, -3, -4)
[V] Water: 3-7 DAYS
[ ] :
[V] :For 1991 study: 67 DAYS, pH 5/22 days
[ ] : (2 % acetone sensitized)

[V] Soil :7-14 DAYS ON ClLm ([ ] 1991 study: 182 DAYS on Sandy loam)
[ ] Air :

Aerobic Soil Metabolism (162-1)
[V] 20-70 DAYS, ClLm AND SiLm
[V] 50-70 DAYS ClLm
[V] 30-50 DAYS SlClLm
[ ]
[ ]
[ ]
[ ]

Anaerobic Soil Metabolism (162-2)
[V] 20-50 DAYS ClLm
[V] 50 DAYS SlClLm
[ ]
[ ]
[ ]
[ ]
[ ]

Anaerobic Aquatic Metabolism (162-3)
[S] 6.4 DAYS IN WATER AND 126 DAYS IN SiLm SEDIMENT.
[ ]
[ ] For 1991 study (MRID #417558-01; EFGWB #91-0399): 7-14 days in
[ ] SiLm sediment (dark, 25 oC).
[ ]
[ ]
[ ]

Aerobic Aquatic Metabolism (162-4)
[S] DEGRADATE RP-30228 COMPRISED UP TO 50% OF THE TOTAL RESIDUE
[ ] IMMEDIATELY POST-TREATMENT.
[ ]
[ ] For 1991 study: 3-7 DAYS in flooded SiLm SEDIMENT system.
[ ]
[ ]
[ ]

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY.
IPRODIONE
Last Update on December 23, 1992
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Soil Partition Coefficient (Kd) (163-1)
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Soil Rf Factors (163-1)
[V] IN SOIL COLUMN STUDIES, WITH Lm MUD, SdLm, ClLm, AND SiClLm, MOST
[ ] OF THE ACTIVITY WAS IN THE UPPER 10 CM; IN LEACHATE, 2% FROM
[ ] SiClLm, LESS THAN 1% FROM OTHERS.
[ ]
[ ]
[ ]

Laboratory Volatility (163-2)
[ ]
[ ]

Field Volatility (163-3)
[ ]
[ ]

Terrestrial Field Dissipation (164-1)
[V] 20-40 DAYS SAND, LOAM, SilLm
[V] 20-40 DAYS SimClLm
[V] WITH SAMPLING AT 0-2, 2-4, AND 4-6". T1/2 VALUES WERE:
[ ] - NORTHEASTERN 15-45 DAYS; SOUTHEASTERN 8-30 DAYS;
[ ] - SOUTHWEST 15-90 DAYS; MIDWEST 40-50 DAYS
[ ]
[S] California: 7 days in the 0-15 cm, degradate is RP-30228, and
[ ] 32490, no parent or degradate below 30 cm.
[S] North Carolina: 0.35 days, degradate RP-30228 was not detected
[ ] below 15 cm.

S

Aquatic Dissipation (164-2)
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Forestry Dissipation (164-3)
[ ]
[ ]

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
IPRODIONE
Last Update on December 23, 1992
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Long-Term Soil Dissipation (164-5)
[ ]
[ ]

Accumulation in Rotational Crops, Confined (165-1)
[ ]
[ ]

Accumulation in Rotational Crops, Field (165-2)
[S] AFTER MAX. USE RATE APPL., DETECTABLE RESIDUES FOUND IN SORGHUM,
[ ] CORN, SOYBEANS, WHEAT, AND PEAS.

Accumulation in Irrigated Crops (165-3)
[S] Not detected (<0.05 ppm) in sorghum, soybeans, sweet potatoes,
[ ]

Bioaccumulation in Fish (165-4)
[V] BLUEGILL EDIBLE: 102X, VISCERA 555X, WHOLE 180X.
[V] CATFISH EDIBLE: < 50X, VISCERA 500X, WHOLE < 50X.

S

Bioaccumulation in Non-Target Organisms (165-5)
[S] EC 50, 96 HR DATA: TROUT, 4.2 PPM, OYSTER, 2.3; DAPHNIA < 0.33,
[ ] BLUEGILL 8.6.

Ground Water Monitoring, Prospective (166-1)
[ ]
[ ]
[ ]
[ ]

Ground Water Monitoring, Small Scale Retrospective (166-2)
[ ]
[ ]
[ ]
[ ]

Ground Water Monitoring, Large Scale Retrospective (166-3)
[ ]
[ ]
[ ]
[ ]

Ground Water Monitoring, Miscellaneous Data (158.75)
[ ]
[ ]
[ ]

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
IPRODIONE
Last Update on December 23, 1992
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Field Runoff (167-1)
[ ]
[ ]
[ ]
[ ]

Surface Water Monitoring (167-2)
[ ]
[ ]
[ ]
[ ]

Spray Drift, Droplet Spectrum (201-1)
[ ]
[ ]
[ ]
[ ]

Spray Drift, Field Evaluation (202-1)
[ ]
[ ]
[ ]
[ ]

Degradation Products

-Dichloroaniline (see enclosure for others)
-RP-30228 accounts for 71% of radioact. in sediment extracts in anaerobic aquatic study.
-pH and temperature have marked effect on persistence.

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
IPRODIONE
Last Update on December 23, 1992
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Comments

-List "B" chemical.
-Leaching-soil column study: Glycophene leached 10-15 cm in 30 cm column with 50 cm water in 30 hrs, using LmSd, SdLm,and ClLm. It leached 15-20 cm for SlClLm. Leaching is a potential problem only in soils of acidic pH and fine texture.
-Koc = 700.

References: REG STD and EFGWB Chemical File
Writer : PJH, MIR

LIN 5721-93

Iprodione EF Reviews

Page_____ is not included in this copy.

Pages 27 through 36 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.

DATA EVALUATION RECORD

STUDY 1B

CHEM 109801 Iprodione §163-1

FORMULATION--00--ACTIVE INGREDIENT

STUDY ID 41889601
Doble, M.L., J.R. Outram, and G.L. Reeves. 1991. Iprodione-^{14}C: Aged leaching study with four soils. Laboratory Project ID: P91/050. Unpublished study performed by Rhone-Poulenc Agricultural Ltd., Essex, England, and submitted by Rhone-Poulenc Ag Company, Research Triangle Park, NC.

DIRECT REVIEW TIME = 10

REVIEWED BY: N. Shishkoff TITLE: Staff Scientist

EDITED BY: K. Ferguson TITLE: Task Leader
L. Mickley Staff Scientist

APPROVED BY: W. Spangler TITLE: Project Manager

ORG: Dynamac Corporation
Rockville, MD
TEL: 301-417-9800

APPROVED BY: José Luis Meléndez
TITLE: Chemist
ORG: EFGWB/EFED/OPP
TEL: 703-305-7495

SIGNATURE: José Luis Meléndez
12/23/92

CONCLUSIONS:

Mobility - Leaching and Adsorption/Desorption

1. This study cannot be used to fulfill data requirements.

2. The data is of uncertain value and should not be used to predict the environmental behavior of iprodione and its degradates.

3. This study is unacceptable for the following reason:

   the analytical methods did not provide consistent results; an accurate determination of the number and quantity of degradates in the soil could not be made.

   In addition, this study does not meet Subdivision N guidelines for the following reason:

   the test substance was aged longer than one half-life; only 21% of the applied radioactivity was undegraded [^{14}C]iprodione at the initiation of leaching.

4. Since the analytical methods did not provide consistent results and since the test substance was aged longer than one half-life, the problems with this study cannot be resolved with the submission of additional data. Therefore, a new study must be submitted.

METHODOLOGY:

Sieved (2 mm) sandy loam soil (designated "sandy loam 1"; 72% sand, 13% silt, 15% clay, 1.21% organic matter, pH 7.1, CEC 8.72 meq/100 g) was moistened to 75% of field capacity and treated at approximately 28.6 ppm with a mixture of uniformly phenyl ring-labeled [^{14}C]iprodione (radiochemical purity >98%, specific activity 18.89 mCi/mMol, Rhone-Poulenc) plus unlabeled iprodione (1:5.23 ratio) dissolved in acetonitrile. The soil was mixed, then incubated in the dark at 20 $\pm$ 2°C. Moist air was drawn through the sample chamber, then exhausted through a polyurethane foam plug and a 2 M KOH solution to trap volatile metabolites and CO_2, respectively. The soil was remoistened to maintain water content. Subsamples of the soil were removed at 0, 7, 14, 21, and 24 days posttreatment, and analyzed using LSC, TLC, and HPLC as described below. The foam plugs and trapping solutions were removed and replaced with fresh traps at each sampling interval. The foam plugs were extracted by occasional shaking with acetone over a 3-hour period; aliquots of the acetone extracts and the trapping solutions were analyzed for total radioactivity using LSC.

Columns (3.8-cm id) were constructed from fifteen 2-cm segments of thick-walled glass tubing (Figure 1). Duplicate columns were packed with vibration to a depth of 30 cm with air-dried and sieved sand, loam, or

sandy loam soils (Tables 1 and 2). The columns were slowly wetted with distilled water to reduce channeling. The surface soil (approximately 20 g) was removed from the top of each column and replaced with 20 g (air-dry equivalent) of treated, aged (24 days) sandy loam soil; it was stated that [^{14}C]iprodione residues were transferred to columns at a rate equivalent to 5 kg ai/ha. The upper soil surfaces were covered with glass fiber disks, and each column was leached in the dark with 576 mL (20 inches) of 0.005 M aqueous $CaCl_2$ solution. The columns were drained for 1-2 days, and leachate fractions were collected. Following leaching, the soil columns were dismantled and divided into 6-cm segments.

Aliquots of the leachates were analyzed using LSC. Portions of the soil column segments and of the soil samples collected during the aerobic aging were mixed with scintillation cocktail and analyzed using LSC. Additional portions of the soils were Soxhlet-extracted with acetonitrile for 3 hours, then cooled; the extracts were decanted and aliquots were analyzed for extractable radioactivity using LSC. The extracted soil was air-dried, mixed with cellulose powder, and analyzed using LSC following combustion. The acetonitrile extracts from the 0- to 6-cm soil column segments were dried by rotary evaporation; the resulting residues were redissolved in acetonitrile, concentrated with a stream of nitrogen, and analyzed using one-dimensional TLC and HPLC. The soil extracts were cochromatographed with [^{14}C]iprodione, RP-30228, RP-32596, RP-36221, and 3,5-dichlorophenol reference standards on silica gel plates developed with either methylene chloride:acetone (95:5, v:v) or methylene chloride:ethyl acetate:acetic acid (85:10:5, v:v). Following development, the plates were air-dried. Radioactive areas were located and quantified using a TLC linear analyzer, and standards were visualized using UV (254 nm) light.

Additional aliquots of the soil extracts were analyzed using HPLC with a mobile phase of acetonitrile:0.05 M ammonium acetate (1:1, v:v), and UV (240 nm) and radioactivity detection. Also, after HPLC separation of the eluate from "a representative 0-6 cm soil sample", the samples were analyzed by negative ion thermospray MS.

DATA SUMMARY:

Based on column leaching studies, [^{14}C]iprodione residues were mobile in sand and slightly mobile in sandy loam, and loam soil columns (30-cm length) that were treated with [^{14}C]iprodione residues equivalent to approximately 5 kg ai/ha and leached with 20 inches of 0.005 M calcium chloride solution. Phenyl ring-labeled [^{14}C]iprodione (radiochemical purity >98%) was aged in sandy loam soil in the dark at 20 $\pm$ 2°C and 75% of field moisture capacity for 24 days prior to application of the resulting [^{14}C]residues to the soil columns. Recovery of [^{14}C]residues from the columns following leaching ranged from 88.8 to 104.9% of the applied (Table 4).

In the sand soil columns, 42.6-59.5% of the applied radioactivity was recovered from the 0- to 6-cm depth, 7.7-11.5% from the 6- to 12-cm

depth, 10.9-12.1% from the 12- to 18-cm depth, 6.2-8.0% from the 18- to 24-cm depth, and 5.1-5.4% from the 24- to 30-cm depth (Table 4). [^{14}C]Residues in the leachate totaled 9.9-15.5% of the applied.

In the "sandy loam 1" soil columns, 58.1-60.8% of the applied radioactivity was recovered from the 0- to 6-cm depth, 14.3-15.6% from the 6- to 12-cm depth, 7.6% from the 12- to 18-cm depth, and 1.4-4.0% from the 18- to 24- and 24- to 30-cm depths (Table 4). [^{14}C]Residues in the leachate totaled 1.7-3.6% of the applied.

In the "sandy loam 2" soil columns, 73.3-79.6% of the applied radioactivity was recovered from the 0- to 6-cm depth, 10.3% from the 6- to 12-cm depth, 2.0-3.3% from the 12- to 18-cm depth, and <1% from the 18- to 24- and 24- to 30-cm depths (Table 4). [^{14}C]Residues in the leachate totaled 0.4-0.5% of the applied.

In the loam soil columns, 78.2-85.0% of the applied radioactivity was recovered from the 0- to 6-cm depth, 7.9-11.2% from the 6- to 12-cm depth, 0.9-2.3% from the 12- to 18-cm depth, and <0.5% from the 18- to 24- and 24- to 30-cm depths (Table 4). [^{14}C]Residues in the leachate totaled 0.2% of the applied.

In the 24-day aged soil prior to leaching, approximately 21% of the applied was undegraded [^{14}C]iprodione, 5.35-16.69% was

3,4-dichloroaniline (RP-32596),

4.33-8.17% was

1-(3,5-dichlorophenyl)carbamoyl-3-isopropylhydantoin (RP-30228),

and 4.42% was

3,5-dichlorophenol;

at least four degradates which were present at 1.89 to 48.60% of the applied were unidentified (Table 7). After 24 days of aging, unextracted [^{14}C]residues totaled 23.5% of the applied (Table 3).

Following leaching, soil extracts from the 0- to 6-cm soil column segments were analyzed using one-dimensional TLC on plates developed in either methylene chloride:acetone (95:5) or methylene chloride:ethyl acetate:acetic acid (85:10:5) and using HPLC. Using the methylene chloride:acetone solvent system, [^{14}C]iprodione comprised 13.58-24.32% of the recovered;

3-(1-methylethyl)-N-(3,5-dichlorophenyl)-1-ureylenecarboxamide (RP-36221)

comprised 16.17-26.16%; RP-32596 was 7.15-17.76% and RP-30228 was 11.57-14.60% (in the "sandy loam 2" soil, RP-32596 was not distinguished from

RP-30228 and together comprised 14.63%); an unidentified compound ("Met II") was 1.78-10.54%; and origin material was 24.95-35.09% (Table 5). Using the methylene chloride:ethyl acetate:acetic acid solvent system, [^{14}C]iprodione comprised 15.31-31.36% of the recovered; RP-36221 comprised 8.28-11.49%; RP-32596 was 9.27-12.33%; RP-30228 was 5.66-13.09%; three unidentified compounds ("Met 1-3") were 4.60-8.10, 3.00-5.21, and 22.38-29.17%; and origin material was 8.06-15.95% (Table 6). Using HPLC, [^{14}C]iprodione comprised 19.31-22.68% of the recovered; RP-36221 was not detected; RP-32596 was 36.14-46.65%; RP-30228 was 4.67-13.30%;

RP-25040

was 18.82-23.78%; and one unidentified compound ("Met A") was 5.59-7.60% (Table 8).

Soil extracts from the 6- to 12-cm "sandy loam 1" soil column segment contained approximately 8-9% of the recovered as [^{14}C]iprodione in both solvent systems used for TLC analysis. Using the methylene chloride:acetone solvent system, RP-36221 comprised 15.16% of the recovered, RP-30228 was 20.54%, two unidentified compounds were 5.87 and 8.87%, and origin material was 41.35% (Table 5). Using the methylene chloride:ethyl acetate:acetic acid solvent system, origin material was 24.52% of the recovered, five degradates that "did not correspond to those in the 0-6 cm layers" were isolated but not quantified, and 3,5-dichlorophenol was identified but not quantified (Table 6). HPLC analysis of soils from the 6- to 12-cm depths isolated [^{14}C]iprodione, RP-32596, RP-36221, RP-25040, and three unidentified compounds.

COMMENTS:

1. The soil extracts were analyzed using two TLC solvent systems and one HPLC system, and the resulting data were not similar. The study authors did not attempt to integrate the three sets of data. For example, in the three systems, the measured concentrations of RP-36221 in the sand soil ranged from 0 to 23.04%, and of RP-32596 in loam soil ranged from 9.27 to 46.65%. Also, RP-25040 was reported to comprise up to 29.23% of the recovered radioactivity, but was only detected using HPLC.

2. Unidentified extractable degradates comprising up to 11.49% of the recovered from the 0- to 6-cm soil column depth were not identified. The number of degradates that were not identified could not be determined because of the discrepancies between the analytical methods.

3. [^{14}C]Iprodione was aged for approximately two half-lives, so that only 22% of the radioactivity applied to the columns was iprodione. Although analysis of soil samples collected during the aerobic aging period showed that the half-life of iprodione was approximately 11 days, these samples were apparently not analyzed until after the leaching portion of the study; the study authors used the 24-day soil in the leaching portion of the study.

4. [^{14}C]Residues in the soil from the 6- to 12-cm segments were not adequately characterized (it was stated that many of the results were not "meaningful"), and soil segments below the 6- to 12-cm depth were analyzed only using LSC. [^{14}C]Residues in the leachate from the sand soil, which comprised 9.9-15.5% of the applied, were analyzed by LSC but were not characterized.

5. The chemical names of identified [^{14}C]degradates were not provided and the structure for RP-25040 ("Met B") was not provided. Using the RP-code name, the reviewer located most chemical names using previously reviewed studies.

6. This study was conducted using phenyl ring-labeled [^{14}C]iprodione. No data were provided for the imidazole ring-labeled moiety.

7. The application rate was approximately 5 kg ai/ha (about 4.5 lb ai/A). The maximum application rate of iprodione is 4 lb ai/A.

STUDY AUTHOR(S)'S RESULTS AND/OR CONCLUSIONS

(INCLUDING PERTINENT TABLES AND FIGURES)

PIN 5721-93

Iprodione EF Reviews

Page____ is not included in this copy.

Pages 44 through 57 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.

DATA EVALUATION RECORD

STUDY 2

CHEM 109801 Iprodione §164-1

FORMULATION--06--WETTABLE POWDER (WP)

STUDY ID 41877401
Norris, F.A. 1991. A terrestrial field soil dissipation study with iprodione. Study No. EC/P-89-0013. File No. 40644. Unpublished study performed and submitted by Rhone-Poulenc Ag Company, Research Triangle Park, NC.

DIRECT REVIEW TIME = 20

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CONCLUSIONS:

Field Dissipation - Terrestrial

1. This study is acceptable and provides supplementary information to fulfill the data requirement. A final decision on the acceptability of the Field Dissipation studies will be made upon receipt of the Laboratory Metabolism Studies.

2. In California, iprodione (Rovral, 50% WP) dissipated with an observed half-life of approximately 7 days in the 0- to 15-cm depth of a silt loam soil planted to carrots that was treated with eight weekly applications of 1 lb ai/A/application. No residues were recovered from depths >30 cm. Two degradates, 3-(1-methylethyl)-N-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide (RP-30228) and 3-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide (RP-32490), were recovered from the samples; degradate RP-30228 had a registrant-calculated half-life of 113 days and degradate RP-32490 had a registrant-calculated half-life of 16.0 days.

3. In North Carolina, iprodione (Rovral, 50% WP) dissipated with an observed half-life of less than 4 days and a 50% dissipation time of 0.35 days, calculated by non-linear regression, in the 0-15 cm depth of a loamy sand soil planted to carrots that was treated with eight weekly applications of 1 lb ai/A/application. No residues were found below the 0-15 cm depth. The same degradates were found. RP-30228 had a registrant calculated half-life of 214.5 days.

Ancillary Study - Freezer Storage Stability

1. Iprodione and its degradate, 3-(1-methylethyl)-N-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide (RP-30228), were stable in soil stored frozen (temperature not given) for up to 8 months. The degradate 3-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamid (RP-32490) was stable in soil stored frozen for up to 9.3 months.

2. This study is scientifically sound. Based on the information provided by this study, soil samples containing iprodione and RP-30228 may be stored frozen for up to 8 months prior to analysis; soil samples containing RP-32490 may be stored frozen for up to 9.3 months prior to analysis.

3. No additional data on the stability of iprodione and its degradates in soil during frozen storage are required at this time.

METHODOLOGY:

San Juan Bautista, California: Iprodione (Rovral, 50% WP) was applied at 1 lb ai/A at weekly intervals to carrots planted in a plot (40 x 40 meters) of silt loam soil (59-69% sand, 20-30% silt, 11% clay, 0.5-0.9% organic matter, pH 7.9-8.0, CEC 10.1-12.8 meq/100 g)

located in San Juan Bautista, California between April 5 and May 24, 1989. There was a total of eight applications. No control plot was reported. This site was irrigated with well water (pH 8.0).

Clayton, North Carolina: Iprodione (Rovral, 50% WP) was applied at 1 lb ai/A at weekly intervals to carrots planted in a plot (20 x 42.5 meters) of loamy sand soil (70-90% sand, 5-7% silt, 5-25% clay, 0.5-0.8% organic matter, pH 6.2-6.8, CEC 1.4-1.7 meq/100 g) located in Clayton, North Carolina between June 5 and August 7, 1989. There was a total of eight applications. No control plot was reported. The site was irrigated with water from a central farm pond (pH 7.1).

Sampling and analytical procedure: The treated plot was divided into four subplots. Four soil cores were collected with a bucket augur from each subplot immediately after each application, and at 0.25, 0.5, 1, 2, 4, 6, 8, 10, 12, 14, 16, and 18 months after the final application. Each soil core was divided into 0 to 15, 15 to 30, 30 to 60, and 60 to 90 cm segments; the segments were composited by soil depth within each subplot, then subsampled. Samples were then frozen on dry ice and shipped to the analytical laboratory for extraction and analysis. The samples were stored frozen up to 7 months before analysis.

The soil samples (50 g) were refluxed for one hour with acidified water:acetone (10:90, v:v), vacuum-filtered, and rinsed with additional water:acetone. The filtrates were concentrated at 30-35°C and the remaining aqueous solution was mixed with 1% sodium sulfate in water and partitioned three times with ethyl acetate:methylene chloride (10:90, v:v). The aqueous portion was discarded and the ethyl acetate:methylene chloride fraction was passed through anhydrous sodium sulfate to remove all traces of water; 1% decanol in acetone was added and the fraction was evaporated at 30-35°C. The residue was dissolved in acetone:hexane (15:85, v:v) and purified by washing through a florisil column eluted with acetone:hexane (15:85 and 20:80, v:v). The first 110 mL of eluant contained iprodione and 3-(1-methylethyl)-N-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide (RP-30228); the second fraction (200 mL) contained (RP-32490) 3-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide. Each fraction was separately treated with five drops of 1% decanol in acetone and both fractions were rotary evaporated to dryness at 30-35°C. The residues were dissolved in benzene and analyzed by GC with electron capture detection. Recovery efficiencies from soil samples from both sites fortified at 0.01 and 0.5 ppm were 73-102% for iprodione, 82-120% for RP-30228, and 73-114% for RP-32490. Detection limits were 0.01 ppm for iprodione and RP-30228, and were 0.02 ppm for RP-32490.

Ancillary Study - Freezer Storage Stability

Soil samples from North Carolina were fortified with reference standards of iprodione, RP-30228, and RP-32490 at 0.01, 0.02 and 0.05 ppm. Samples were extracted immediately, or frozen (temperature not

specified) and sampled at 1, 2, 4, 6-6.6, and 8-9.3 months posttreatment; extraction and analysis was as described above.

DATA SUMMARY:

Iprodione (Rovral, 50% WP) applied in eight weekly applications of 1 lb ai/A/application, dissipated with registrant-calculated nonlinear half-lives of 6.2 days from a silt loam soil planted to carrots in California, and 0.35 days from loamy sand soil planted to carrots in North Carolina. In general, iprodione did not leach below 0.30 m. One major degradate,

3-(1-methylethyl)-N-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide (RP-30228),

and one minor degradate,

3-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide (RP-32490),

were recovered from both sites. No iprodione residues were found in the pretreatment samples; no control samples were analyzed.

In San Juan Bautista, California, iprodione dissipated from the upper 0- to 15-cm depth with a registrant-calculated nonlinear half-life of 6.2 days. Iprodione ranged from 0.29 to 0.66 ppm immediately after each of the eight applications. Iprodione was 0.66 ppm immediately after the eighth (and final) application, decreased to 0.32 ppm by 7 days, 0.14 ppm by 13 days, and 0.01 ppm by 194 days; iprodione was not recovered after 244 days after the final application (Table VI). Iprodione was recovered from the 15- to 30-cm depth at ≤0.07 ppm immediately after four of the applications (the third, fifth, sixth, and seventh) and at 1 week after the eighth application. Iprodione was not detected below this depth at any sampling interval.

In the 0- to 15-cm depth immediately after each of the eight applications, the degradate RP-30228 ranged from <0.01 to 0.34 ppm. RP-30228 was detected at a maximum of 0.47 ppm at 28 days after the eighth application and declined to 0.15 ppm at 538 days after that application (Table VII). In the 15- to 30-m depth, RP-30228 was detected at 0.01 to 0.06 ppm at several sampling intervals. This degradate was not detected at any sampling interval in either the 30- to 60-cm or 60- to 90-cm soil sampling depth. A second degradate, RP-32490, was detected at ≤0.09 ppm in the 0- to 15-cm depth, and was not detected at any sampling interval in the deeper soil depths (Table VIII).

During the study, air temperatures ranged from -6.1 to 41.1 C and soil temperatures at the 10-cm depth ranged from 5.0 to 36.7 C. Cumulative precipitation plus irrigation totaled 97.3 cm. The slope was 0.5%; the depth to the water table was >15 m.

In Clayton, North Carolina, iprodione dissipated from the upper 0- to 15-cm depth with a registrant-calculated nonlinear half-life of 0.35 days. Iprodione ranged from 0.22 to 0.74 ppm immediately after each of the eight applications. Iprodione was 0.22 ppm immediately after the eighth (and final) application, decreased to 0.05 ppm by 7 days and 0.01 ppm by 310 days; iprodione was not recovered after 310 days following the final application (Table X). No residues were found below the 0- to 15-cm depth.

In the 0- to 15-cm depth, the degradate, RP-30228 ranged from 0.01 to 0.08 ppm from immediately after the second application until 492 days after the eighth application; RP-30228 was not detected at 539 days after the eighth application (Table XI). A second degradate, RP-32490, was detected at ≤0.06 ppm in the 0- to 15-cm soil depth (Table XII). Neither degradate was detected below the 0- to 15-cm depth.

During the study, air temperatures ranged from -12 to 37°C and soil temperatures at the 0.1-m depth ranged from -0.6 to 32.8°C. Cumulative precipitation plus irrigation totaled 232.7 cm. The slope was 1.5%; the depth to the water table was 1-3 m.

Ancillary Study - Freezer Storage Stability

Iprodione and its degradates were relatively stable when stored frozen in North Carolina soil. Recoveries were 74-98% and 83-92% for iprodione and RP-30228, respectively, in samples stored up to 8 months, and were 73-94% for RP-32490 in samples stored up to 9.3 months.

COMMENTS:

General

1. There were no control plots mentioned in connection with this study. There were samples taken immediately prior to the first application of pesticide, but apparently no control samples were taken during the study.

2. The study author stated that filter paper placement was predetermined by a "computerized random number technique"; location grid diagrams specifying filter paper placement are given in Tables XIX and XX. No further methodology or data regarding the filter papers were presented with this study.

3. Very little information was provided for the freezer storage stability experiment. The study author stated that the North Carolina soil was used but it was not clear if this was soil collected from the site in this study, or when this soil was collected. Information was not included on the fortification, storage temperature, and sample handling during thawing, extraction, and analysis.

4. At each field site, 500 g of untreated soil was fortified with 0, 5, 10, or 25 ug of iprodione in methanol. These fortified soils were frozen and shipped in the same manner as the samples. Recoveries from the field spikes were 66-86% for iprodione for both California and North Carolina samples. Recoveries of RP-30228 added to field samples at 0.01, 0.02, and 0.05 ppm were 68-102% and 64-78% for California and North Carolina samples, respectively. Recoveries of RP-32490 were 0-75% for California samples and 0-18% for North Carolina samples. The study author concluded that the fortification solution for RP-32490 may not have been added properly.

5. Samples that were taken within 20 days of application were frozen and shipped on dry ice to the analysis laboratory. The author did not report the handling of samples taken after 20 days postapplication. The protocol states that the samples taken after ten days of application should be shipped the same day of frozen until shipment.

6. The study author reported that within an hour of each application, soil cores were taken. "Each soil core consisted of a single 0.0-0.2 m increment which was taken with a 76.2-mm diameter copper pipe..." Data taken from these 0-20 cm cores were not reported in this study. The samples for this study were reportedly taken in 15-cm increments with a bucket auger.

7. The limit of detection is 0.01 ppm for iprodione and RP30228, and 0.02ppm for RP32490.

California site

1. The half-life of approximately 7 days (6.2 days) cited in this study was calculated by nonlinear regression analysis and agreed with the observed 50% dissipation time. Linear regression analysis for these data gave half-lives of 42 days when all data were considered and 16 days when only the first two months after the eighth application were considered.

2. The author calculated a nonlinear regression half-life of 113 days for the main degradate RP-30228; the linear regression half-life for this compound was calculated to be 319 days.

3. Carrots were planted in California on March 15, 1989. The first application of iprodione was April 5 when the carrots were 75 mm in height.

4. The irrigation data were recorded on-site. The rainfall and air temperature data were recorded at Hollister, approximately 5 miles from the study site. Soil temperature data were from a NOAA stations located in Davis, approximately 70 miles from the study site.

5. The text stated that the test site had been planted to wheat as a cover crop during 1987 and 1988; the table of prior crop history

stated that the crop was alfalfa. No agricultural chemicals were used during these years.

6. For April 1989, some of the temperature data are actually in degrees Fahrenheit instead of degrees Celsius as listed.

North Carolina site

1. The concentration of iprodione in the soil decreased from 0.22 ppm after the eighth application to 0.05 ppm at the next sampling interval (7 days later). Since 77% of the iprodione dissipated between the final application and the first sampling following the final application, a dissipation half-life cannot be established with accuracy.

2. The half-life of 0.35 days cited in this review was calculated by nonlinear regression analysis and agreed with the observed 50% dissipation time. Linear regression analysis for these data gave half-lives of 126 days when all data were considered and 24 days when only the first two months after the eighth application were considered.

3. The concentration of iprodione after each application varied widely at this site, ranging from 0.22 to 0.74 ppm. They are indicative of fast dissipation of the parent material.

4. The author calculated a linear regression half-life of 215 days for the main degradate RP-30228; the nonlinear regression analysis did not give a significantly different result.

5. The rainfall, irrigation, and air temperature data were recorded on-site; soil temperature data were from a NOAA station located at Raleigh-Durham Airport, approximately 20 miles from the study site.

6. In 1989, the North Carolina site was disked and treated with glyphosate (1 lb/A) on March 17 and trifluralin (1 pt/A) on May 16; 400 lbs of fertilizer was also applied. Carrots were planted on May 22 and the first application of Rovral was June 5, when the carrots were 25 mm tall.

7. The test site had been planted to soybeans in 1987 and 1988; no agricultural chemicals were applied during these years.

8. Soil temperature data from NOAA were not available for the last 4 months of the study (November 1990-February 1991).

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Iprodione EF Reviews

Page_____ is not included in this copy.

Pages 65 through 89 are not included.

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DATA EVALUATION RECORD

STUDY 1C

CHEM 109801 Iprodione §164-2 165-3

FORMULATION--06--WETTABLE POWDER (WP)

STUDY ID 00162218

Gemma, A.A., G.F. Heinzelmann, and J.P. Wargo. 1986. Iprodione aquatic field dissipation and field irrigated crop study. ASD Report No. 86/196 and Lab. Ref. No. 86/BHL/326/AG. Unpublished study performed by Agrisearch Incorporated, Frederick, MD, and submitted by Rhone-Poulenc Inc., Monmouth Junction, NJ.

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CONCLUSIONS:

Field Dissipation - Aquatic and Aquatic Impact

1. This portion of the study cannot be used to fulfill data requirements.

2. The study is not acceptable for the following reason:
   High variability in the results was observed. The results are of uncertain value and should not be used to assess the environmental fate of iprodione.
   The initial concentrations of iprodione in water varied widely between replicate plots, ranging from 0.02 to 0.70 ppm in the AR plots and 0.11 to 0.63 in the Louisianna plots. The degradate RP-30228 comprised up to 50% of the total residues in the AR plots immediately after treatment.

3. In addition, this portion of the study does not meet Subdivision N guidelines for the following reasons:
   Freezer storage stability data were not provided.
   Sampling procedures were not adequately described.
   At the Arkansas site, the study was not conducted for a sufficient length of time.

4. Because the problems with this study cannot be resolved with the submission of additional data, a new study is required.

5. Iprodione dissipated with observed half-lives of <3 and 7-14 days in paddy water of flooded rice plots of silt loam soil located in Arkansas and Louisiana, respectively, following two treatments (14-day interval) of iprodione (Rovral, 50% WP) at 0.50 lb ai/A/application to the flooded rice plots during July and August 1985. Degradates detected in the paddy water included 1-(3,5-dichloroanilino)carbonyl-3-isopropylamino-2,4-dioxoimidazolidine (RP-30228) and RP-32490. Iprodione and RP-30228 were detected in the 0- to 8-cm sediment layer at both sites and in the 8- to 16-cm sediment layer at the Louisiana site; RP-32490 was not detected in the sediment at either site.

Field Accumulation - Irrigated Crops

1. This portion of the study cannot be used to fulfill data requirements at this time.

2. Iprodione and the degradates 1-(3,5-dichloroanilino)carbonyl-3-isopropylamino-2,4-dioxoimidazolidine (RP-30228) and RP-32490 were not detected (<0.05 ppm) in sorghum (whole plant), soybeans (seed, pods, and trash), sweet potatoes (roots), cotton (whole plant and bolls), or soil irrigated with the paddy water from flooded rice plots of silt loam soil located in Arkansas and Louisiana, which received two treatments (14-day interval) of iprodione (Rovral, 50% WP) at 0.50 lb ai/A during July and August, 1985. Iprodione, RP-30228, and RP-32490 were detected at ≤0.13, ≤0.07, and ≤0.08 ppm, respectively, in the irrigation water.

3. This portion of the study is scientifically sound, but does not meet Subdivision N guidelines for the following reasons:

   Freezer storage stability data were not provided.
   Irrigation water flow data were not provided.
   Details of the extraction procedure used for the plant samples were not provided.

4. In order for this portion of the study to fulfill the irrigated crop field accumulation data requirement, the registrant must submit the following information: storage stability data for the soil and crop substrates for the maximum length of time of storage, irrigation water flow data, and a complete extraction methodology for the plant samples.

METHODOLOGY:

Iprodione (Rovral, 50% WP, Rhone-Poulenc) was broadcast sprayed at 0.50 lb ai/A/application twice at a 14-day interval onto flooded rice plots (20 x 30 meters) of silt loam soil (Table 1 in Appendix I) located in New Iberia, Louisiana, and Cotton Plant, Arkansas, during July and August 1985. There were two treated plots and one untreated control plot at each test site. The plots were seeded with rice (Mars variety) on April 29 and May 13, 1985, at the Louisiana and Arkansas sites, respectively. The plots were flooded with on-site well water to a depth of 15-20 cm at the 4-leaf stage, and iprodione was applied at the booting and heading stages. At day 0 after the first treatment, adjacent untreated plots (8 x 20 meters; Figure 1 in Appendix I) were planted to sorghum, soybeans, sweet potatoes, and cotton. These adjacent plots were irrigated at 7, 14, 28, and 47 days after the second treatment with water drained from the rice plots. Water samples (volume unspecified) were collected from the rice plots prior to treatment, at 0, 3, 7, and 14 days after the first treatment, and at 0 (14 days after first treatment), 3, 7, 14, 28, and 47 days after the second treatment. Six sediment samples (diameter unspecified; 0- to 24-cm depth) were collected using a vacuum corer (Figure 3) from each rice plot prior to treatment, at 0, 7, and 14 days after the first treatment, and up to 179 days after the second treatment. Six soil cores were similarly collected from the irrigated plots at 8, 15, 29, and 48 days after the second treatment (one day after irrigation). Sediment and soil cores were frozen on dry ice in the field, then cut into 8-cm segments; segments from corresponding depths were composited and subsampled. At the Louisiana site, rice grain was harvested at 47 days, sorghum (whole plant) and soybeans (seed, pods, and trash) at 109 days, and sweet potatoes (roots) at 121 days after the second treatment; it was not specified at what interval the cotton (whole plant and bolls) was harvested. At the Arkansas site, rice grain was harvested at 28 and 47 days; sweet potatoes, sorghum, and cotton at 105 days; and soybeans at 119 days after the second treatment. All samples were stored frozen for unspecified lengths of time until extraction and analysis.

The water samples were analyzed by Rhone-Poulenc Method No. 180 (Figure 11). Water samples were filtered, then an aliquot (200 mL) was combined with 1% aqueous sodium sulfate:1 N hydrochloric acid (50:1, v:v) and partitioned three times with methylene chloride:ethyl acetate (9:1, v:v). Organic phases were dried over anhydrous sodium sulfate, combined, and evaporated to dryness. The remaining residue was redissolved in toluene and analyzed for iprodione and the degradates 1-(3,5-dichloroanilino)carbonyl-3-isopropylamino-2,4-dioxoimidazolidine (RP-30228) and RP-32490 using GC with nitrogen-phosphorus detection.

The sediment and soil samples were also analyzed by Rhone-Poulenc Method No. 180 (Figure 12). Sediment and soil samples (50 g) were refluxed with acetone:water:1 N hydrochloric acid (180:20:1, v:v:v) for 1 hour. The extract was filtered and the acetone removed by evaporation. Aqueous sodium sulfate (1%) was added to the remaining aqueous phase which was then partitioned three times with methylene chloride:ethyl acetate (9:1). Organic phases were dried over anhydrous sodium sulfate, combined, and evaporated to dryness; the residue was redissolved in hexane and applied to a Florisil column. The column was rinsed with hexane followed by hexane:ethyl acetate (97:3, v:v), then eluted with hexane:ethyl acetate (50:50, v:v). The eluant was evaporated to dryness; the residue was redissolved in toluene and analyzed by GC as previously described.

A detailed extraction procedure for the plant samples was not provided. Briefly, homogenized plant samples were extracted with acetone:water (9:1, v:v) in the presence of 1 N hydrochloric acid. Extracts were partitioned with ethyl acetate:methylene chloride:water (ratios unspecified) followed by clean up with hexane:acetonitrile (all crops), ethyl ether:petroleum ether:acetonitrile (all crops except rice grain), and Florisil column chromatography. Analysis for iprodione and its degradates was performed using GC as described above.

The detection limits for iprodione and its degradates were 0.01 ppm in water and 0.05 ppm in soil and plant samples. Recovery efficiencies from various substrates fortified with iprodione (or RP-26019), RP-30228, and RP-32490 were 61-141% (Table 6).

DATA SUMMARY:

Field Dissipation - Aquatic and Aquatic Impact

Iprodione dissipated with observed half-lives of <3 and 7-14 days in paddy water of flooded rice plots (20 x 30 meters) of silt loam soil located in Arkansas and Louisiana, respectively, following two treatments at a 14-day interval of iprodione (Rovral, 50% WP) at 0.50 lb ai/A/application to the flooded rice plots during July and August 1985. Iprodione was detected in the 0- to 8-cm sediment layer at both sites and in the 8- to 16-cm sediment layer at the Louisiana site; the degradate

1-(3,5-dichloroanilino)carbonyl-3-isopropylamino-2,4-dioxoimidazolidine (RP-30228)

was also detected in the 0- to 8-cm sediment layer at both sites and in the 8- to 16-cm sediment layer at the Louisiana site; the degradate

3-(3,5-Dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide (RP-32490)

was not detected in the sediment at either site.

At Cotton Plant, Arkansas, iprodione in the rice paddy water decreased from an average concentration of 0.32 ppm (maximum 0.49 ppm) immediately after the second treatment to 0.11 ppm at 3 days and ≤0.01 ppm by 7 days (Table 1). In paddy water following the first treatment, RP-30228 was detected at a maximum concentration of 0.70 ppm immediately posttreatment, 0.15-0.49 ppm immediately after the second treatment, 0.01-0.03 ppm between 7 and 28 days, and was not detected (<0.01 ppm) at 47 days (final sampling interval); RP-32490 decreased from a maximum concentration of 0.17 ppm immediately after the second treatment to 0.03-0.08 ppm at 7 days and was ≤0.01 ppm by 14 days. In the 0- to 8-cm sediment layer, iprodione and RP-30228 were detected at

maximum concentrations of 0.13 and 0.22 ppm, respectively, at 179 days after the second treatment (final sampling interval); RP-32490 was not detected (<0.05 ppm) at any sampling interval (Table 2). In the 8- to 16-cm sediment layer, iprodione, RP-30228, and RP-32490 were not detected (<0.05 ppm) at any sampling interval.

At New Iberia, Louisiana, iprodione in the rice paddy water decreased from 0.23 ppm immediately after the second treatment to 0.08-0.13 ppm at 7 days, 0.01-0.03 ppm at 28 days, and was not detected at 47 days. In paddy water, RP-30228 was a maximum concentration of 0.23-0.30 at 3 days after the first treatment, 0.18 ppm at 3 days following the second treatment, and ≤0.01 ppm by 28 days; RP-32490 was ≤0.02 ppm at all sampling intervals (Table 1). In the 0- to 8-cm sediment layer, the average iprodione concentration increased to 0.68 ppm (maximum 1.29 ppm) at 3 days after the second treatment, ranged from 0.11 to 0.35 ppm between 7 and 47 days, was 0.09 ppm at 79 days, and not detected at 179 days; the average concentration of RP-30228 increased to 0.30 ppm (maximum 0.53 ppm) at 3 days after the second treatment, ranged from 0.13 to 0.20 ppm between 7 and 47 days, and was not detected at 79 and 179 days (Table 2). In the 8- to 16-cm sediment layer, iprodione and RP-30228 were detected at maximum concentrations of 0.26 and 0.15 ppm, respectively, at 14 days after the second treatment. RP-32490 was not detected in any sediment sample at any interval.

Field Accumulation - Irrigated Crops

Iprodione, 1-(3,5-dichloroanilino)carbonyl-3-isopropylamino-2,4-dioxoimidazolidine (RP-30228), and RP-32490 were not detected (<0.05 ppm) in sorghum (whole plant), soybeans (seed, pods, and trash), sweet potatoes (roots), cotton (whole plant and bolls), or soil (0- to 8- and 8- to 16-cm depths) irrigated with the paddy water from flooded rice plots of silt loam soil located in Cotton Plant, Arkansas, and New Iberia, Louisiana, which received two treatments at a 14-day interval of iprodione (Rovral, 50% WP) at 0.50 lb ai/A/application during July and August, 1985 (Tables 3 and 5). During the irrigation period (days 8-47 after the second treatment to the flooded rice plots), iprodione, RP-30228, and 32490 were ≤0.01, ≤0.03, and ≤0.08 ppm, respectively, in the paddy water at the Arkansas site, and ≤0.13, ≤0.07, and ≤0.02 ppm, respectively, at the Louisiana site.

COMMENTS:

Field Dissipation - Aquatic and Aquatic Impact

1. At the Arkansas site, the study was not conducted for a sufficient length of time. Sediment samples were collected up to 179 days after the second treatment of iprodione and the concentrations of iprodione and RP-30228, although sporadic, continued to increase in the 0- to 8-cm sediment layer reaching maximums of 0.13 and 0.22 ppm, respectively, at 179 days. Subdivision N guidelines require that the study be conducted until the pattern of decline of the test substance and the patterns of formation and decline of all major degradates is established, or for 12 months (12 months of soil/sediment samples and 1 month of water samples) for a test substance with an aquatic food crop application.

2. For both sites, the number of water samples collected per plot at each sampling interval and the volume of the water samples were not reported.

3. Data concerning residues detected in the rice grain were not presented in this review since they are considered dietary exposure data.

Field Accumulation - Irrigated Crops

1. The study authors reported that immature (25-50% maturity) and mature crops were harvested; however, residue data were only provided for the mature crops.

2. Details of the extraction procedure used for the plant samples were not provided.

3. Irrigation water flow rate and amount of irrigation water applied were not provided.

General

1. Freezer storage stability data were not provided for iprodione and its degradates in the water, sediment (soil), and plant substrates. The degradate RP-30228 comprised approximately 21-88% of the total residues detected in the water samples collected immediately after the first treatment of iprodione. This corresponds to a significant concentration of degradate residues in the immediate posttreatment samples. To determine if significant iprodione degradation occurred between field sample collection and frozen storage, a freezer storage stability study should be conducted using field-spiked samples in addition to laboratory-spiked samples.

2. Rainfall and air temperature data from July 29 (first treatment) to September 7, 1985 and January 1 to February 7, 1986 were not reported; from September 8 to December 31, 1985, rainfall totaled 12.9 inches and air temperatures ranged from 11°F to 93°F. Soil temperatures were not reported. The meteorological data appear to have been collected at Little Rock, which is approximately 60 miles from the test site. It is preferred that weather data be reported for the actual study site, since it is possible that there may be significant climatic differences in weather at the test site and the weather collection site.

3. At the Arkansas site from July to October, 1985, the pH of the well water used to flood the rice plots ranged from 6.38 to 6.85, alkalinity ranged from 32 to 78 mg/L $CaCO_3$, and hardness ranged from 39 to 76 mg/L $CaCO_3$.

4. At the Louisiana site during July to September, 1985, the pH of the well water used to flood the rice plots ranged from 6.51 to 6.71, alkalinity ranged from 118 to 130 mg/L $CaCO_3$, and hardness ranged from 126 to 132 mg/L $CaCO_3$.

During the study, rainfall totaled approximately 52.3 inches and air temperatures ranged from 24°F to 101°F; soil temperatures were not reported.

EIN 5721-93

Iprodione EF Reviews

Page_____ is not included in this copy.

Pages 96 through 121 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.

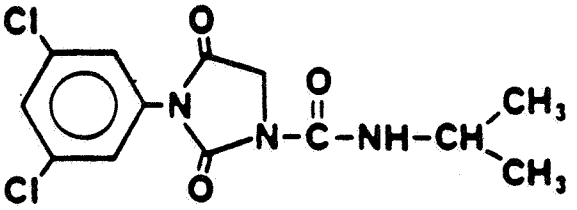
____ The document is a duplicate of page(s) _____.

____ 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.

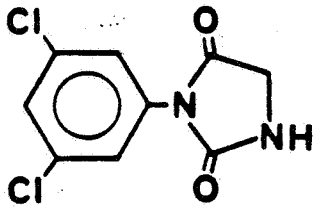
APPENDIX

IPRODIONE AND ITS DEGRADATES

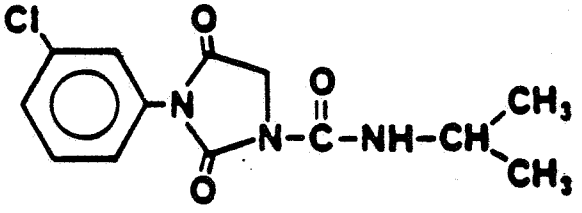


3-(3,5-Dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazolidinecarboxamide

(Iprodione)

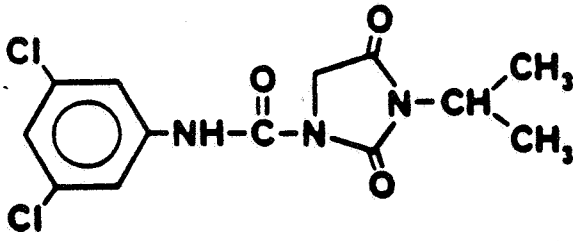


1-(3,5-Dichlorophenyl)-3-hydantoin
(RP-25040)



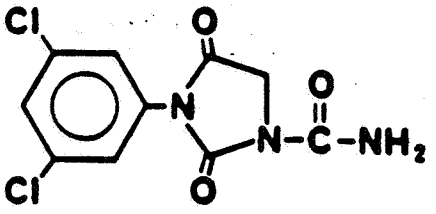
1-Isopropylcarbamoyl-3-(3-chlorophenyl)hydantoin

(RP-25331)



3-(1-Methylethyl)-N-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide

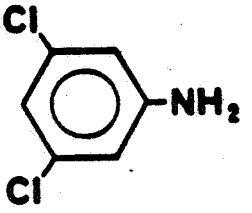
(RP-30228)



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

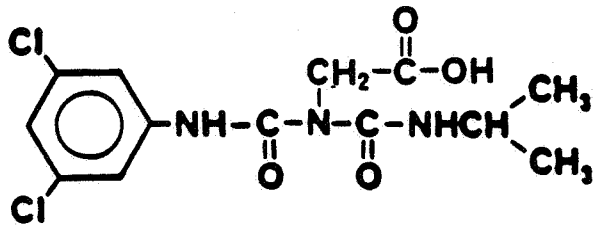
Carbamoyl-1-(3,5-dichlorophenyl)-3-hydantoin

(RP-32490)



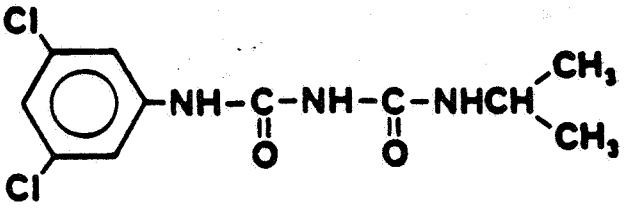
3,4-Dichloroaniline

(RP-32596)



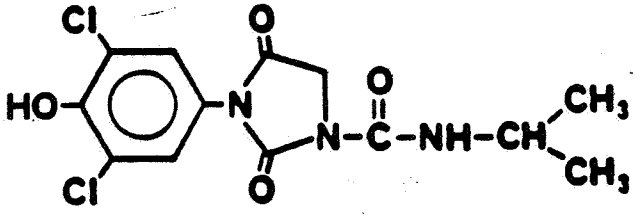
3-(Isopropylcarbamoyl)-5-(3,5-dichlorophenyl)hydantoic acid

(RP-35606)



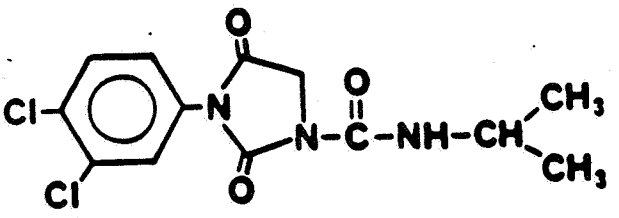
3-(1-Methylethyl)-N-(3,5-dichlorophenyl)-1-ureylenecarboxamide

(RP-36221)



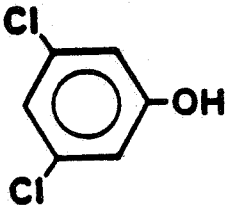
Isopropylcarbamoyl-1-(3,5-Dichloro-4-hydroxyphenyl)-3-hydantoin

(RP-37677)

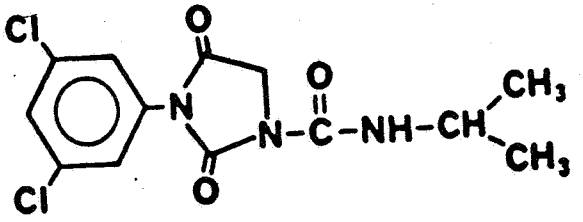


1-Isopropylcarbamoyl-3-(3,4-dichlorophenyl)hydantoin

(RP-40837)



3,5-Dichlorophenol



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

(Iprodione, RP-26019)