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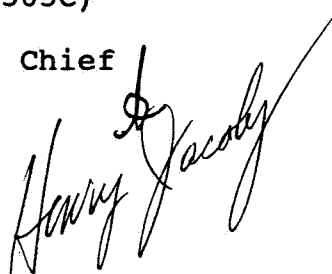
Date Out of EFGWB:

AUG 29 1991

TO: Susan Lewis
Product Manager # 21
Registration Division (H7505C)

FROM: Akiva Abramovitch, Ph.D., Chief
Review Section #3
OPP/EFED/EFGWB (H7507C)

THROUGH: Henry Jacoby, Chief
OPP/EFED/EFGWB (H7507C)



Attached, please find the EFGWB review of:

Submission/Case#: S392658/193783, S392652/193784,
Identifying No. 55947-RGE, 55947-RGG
Common Name : Cyproconazole

Chemical Name : alpha-(4-Chlorophenyl-alpha-(1-cyclopropylethyl)-
1H-1,2,4-triazole-1-ethanol

Product Type : Fungicide

Product Name : San 619F

Company Name : Sandoz Crop Protection Corporation

Purpose : Review Terrestrial Field Dissipation Studies for
support of turf use

Date Received: 3/28/90 EFGWB #(s): 90-0388/0389, 90-0557, 91-0448/0449

Date Completed: 6/20/91

Total Reviewing Time: 15 days

Deferrals to: _____ Ecological Effects Branch/EFED
_____ Science Integration & Policy Staff/EFED
_____ Non-Dietary Exposure Branch/HED
_____ Dietary Exposure Branch/HED
_____ Toxicology Branch I, II/HED

1. CHEMICAL:

Common Name: Cyproconazole

Chemical Name: alpha-(4-Chlorophenyl)-alpha-(1-cyclopropylethyl)-1H-1,2,4-triazole-1-ethanol

Type of product: Fungicide

Chemical Structure:

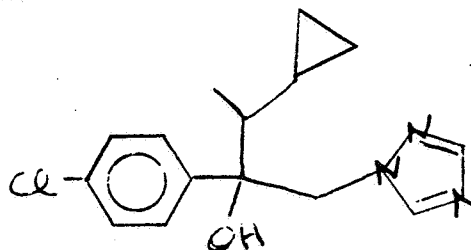
Physical/Chemical Properties

molecular weight: 291.8

aqueous solubility: 140 ppm @ 20°C

vapor pressure: 2.6×10^{-7} torr

Henry's constant: 7.1×10^{-10} atm*m³/mol



2. TEST MATERIAL:

See the attached DERS.

3. STUDY/ACTION TYPE: Review terrestrial field dissipation studies to support registration for turf use

4. STUDY IDENTIFICATION:

(1) MRID No: 41384101 (DER 1)

Addendum to previously submitted study. (MRID 40624301)

Bade, T.R., Guirguis M., Dissipation of Cyproconazole in Soil After Six Applications to Turf, Project No. 433018 performing laboratory Sandoz Crop Protection Corporation, 1300 East Toughy Avenue, Des Plaines, Illinois 60018

(2) MRID No: 41384102 (DER 2)

Guirguis M., Popp J., Dissipation and Mobility of Cyproconazole in Soil After Four Applications to Turfgrass in Maryland, performing laboratory Sandoz Crop Protection Corporation, 1300 East Toughy Avenue, Des Plaines, Illinois 60018

(3) MRID No: 41461501

Guirguis M., Dissipation and Mobility of Cyproconazole in Soil After Four Applications to Turfgrass in Louisiana, performing laboratory Sandoz Crop Protection Corporation, 1300 East Toughy Avenue, Des Plaines, Illinois 60018

(4) MRID No: 41800701

Ali, S., Volume 1 Interim Report on Dissipation and Mobility of Cyproconazole in Soil after Four Applications to Bare Ground in Oregon, performing laboratory Sandoz Crop Protection Corporation, 1300 East Toughy Avenue, Des Plaines, Illinois 60018

(5) MRID No: 41800702

Ali, S., Volume 2 Interim Report on Dissipation and Mobility of Cyproconazole in Soil after Four Applications to Bare Ground in North Carolina, performing laboratory Sandoz Crop Protection Corporation, 1300 East Toughy Avenue, Des Plaines, Illinois 60018

(6) MRID No: 41384105 (DER 6)

Rosas M., Storage Stability of Cyproconazole in Soil, performing laboratory, Analytical Chemistry and Formulations, Sandoz Crop Protection Corporation, 1300 East Touhy Avenue, Des Plaines, Illinois 60018

5. REVIEWED BY:

Kevin L. Poff, Chemist
Environmental Chemistry Review Section #3
Environmental Fate and Groundwater Branch/EFED

Kevin L. Poff
Date: AUG 28 1991

6. APPROVED BY:

Akiva Abramovitch, Ph.D., Chemist
Environmental Chemistry Review Section #3
Environmental Fate and Groundwater Branch/EFED

Akiva Abramovitch
Date: AUG 28 1991

7. CONCLUSIONS:

Terrestrial Field Dissipation: MRID No: 41384101 (DER 1),
Addendum to previously submitted study (MRID 40624301).

(1) Together studies MRID # 41384101 (this report) and study MRID # 40624301 (previously submitted unacceptable study) does not satisfy the terrestrial field 164-1 data requirement for the following reason:

(a) The anomalous results due to frequent sample contamination make it difficult to accurately determine the dissipation rate of cyproconazole.

Terrestrial Field Dissipation: MRID No: 41384102 (DER 2)

(1) Study MRID # 41384102 does not satisfy the Terrestrial Field Dissipation (164-1) data requirement for the following reasons:

(a) The data were too variable in the 0-10 cm soil segments to accurately determine the dissipation rate of cyproconazole.

(b) Cyproconazole detected frequently at depths greater than 10 cm was not included in data points used for half-life calculations and/or discussion.

Terrestrial Field Dissipation: MRID No: 41461501 (DER 3)

(1) Study MRID # 41461501 does not satisfy the Terrestrial Field Dissipation (164-1) data requirement for the following reason:

(a) There is too great a disparity between the short terrestrial field dissipation half-life and great stability indicated in the laboratory studies.

(2) A satisfactory explanation is required to clear up the discrepancy between field and laboratory studies.

(3) The registrant calculated half-life was 21 days when cyproconazole (40%WG) was applied in four broadcast sprays at 0.381 lb a.i./A/application to turfgrass. In the 0- to 10-cm soil depth, cyproconazole levels peaked at 0.53 ppm on day 3 after the last application and declined to < 0.01 ppm on day 186 after the last application.

Terrestrial Field Dissipation: MRID No: 41800701 (DER 4)

(1) Study MRID #41800701 may be made acceptable when the final report is submitted and could be used to partially satisfy the terrestrial field dissipation (164-1) data requirement.

(2) The registrant calculated half-life was 213 days when cyproconazole (40% WG) was applied 4x's at 14 day intervals at 0.384 lbs. ai/A/application to a bareground plot. In the 0- to 10-cm soil depth, cyproconazole levels (mean) increased from 0.21 ppm post first application to 0.71 ppm post fourth application. The mean levels increased in the 0- to 10-cm level from 0.73 ppm on day 7 and decreased to 0.27 ppm on day 180 after last application.

Terrestrial Field Dissipation: MRID No: 41800702 (DER 5)

(1) Study MRID #41800702 may be made acceptable when the final report is submitted and could be used to partially satisfy the terrestrial field dissipation (164-1) data requirement.

(2) The estimated half-life was 173 days when cyproconazole (40% WG) was applied 4x's at 14 day intervals at 0.384 lbs. ai/A/application to a bareground plot. In the 0- to 10-cm soil depth, cyproconazole levels (mean) decreased from 0.48 ppm on day 14 to 0.043 ppm on day 270. Cyproconazole was detected at deeper depths in pre first (10-20cm), 0.02 ppm, post second, (10-20cm), 0.02 ppm, day three (20-30cm), 0.01 ppm and month 2 (10-20cm), 0.01 ppm.

Storage Stability Study: MRID No: 41384105 (DER 6)

(1) Study MRID # 41384105 provides acceptable data on the freezer storage stability of Cyproconazole in soil.

(2) Cyproconazole was analyzed before freezing (Group 1 samples) at below 20°F and 14 months afterward (Group 2 samples). There was no significant difference found in the residue levels of the two groups after SAS TTEST was performed, (P< 0.05). This study indicates that cyproconazole is stable to freezer storage at below 20°F for periods up to 14 months.

8. RECOMMENDATIONS:

Based upon data from acceptable studies cyproconazole has the following characteristics in common with those pesticides that are

known to leach into ground water.

(1) A water solubility > 30 ppm (cyproconazole has a water solubility of 140 ppm)

(2) Stability to hydrolysis at pH's 5, 7, 9.

(3) Photodegradative half-life > 1 week (cyproconazole is stable to photodegradation in water and has a photodegradative half-life of > 37 days on a loam soil.

(4) Aerobic half-life > 2-3 weeks (cyproconazole has an aerobic half-life of > 1.5 years)

(5) Also cyproconazole is moderately mobile in soils of low organic matter content.

ENVIRONMENTAL FATE ASSESSMENT

The data indicate that cyproconazole may pose risks to ground water due mainly to its persistency. In a previous review, (EFGWB#'s 90-0568-0569, 90-0520-0521) the long term terrestrial field dissipation (164-5) was imposed due to cyproconazole's laboratory persistency. However, preliminary data in the terrestrial field dissipation (164-1) studies (MRID #'s 41800701, 41800702) indicate that there is a dissipation of cyproconazole that is significantly less than 1 year. Therefore the long term terrestrial field dissipation study (164-5) is no longer imposed but will remain in reserve pending the results and acceptability of the final reports.

EFGWB is concerned about ground water contamination because cyproconazole is persistent, and moderately mobile. However, the turf studies give an indication that cyproconazole may be less likely to leach under turf use conditions than under terrestrial food uses due to the chemical and physical adsorption of the chemical to the high organic matter of the turf.

The current status of environmental fate data requirements to support the registration of cyproconazole for use on turf is as follows:

(1) Satisfied

161-1. Hydrolysis (MRID # 40607706) Stable to hydrolysis at pH's 5, 7, and 9.

161-2. Photodegradation in Water (MRID # 40607707) Stable

161-3. Photodegradation on Soil (MRID # 40607707) Half-life > 37 days

162-1. Aerobic Soil Metabolism (MRID # 41474401) Half-life > 693 days.

163-1. Leaching and Adsorption/Desorption (MRID # 40607709, 74% of applied radioactivity remained in the top 6-cm of the Gilroy loam after 20 inches of water passed through column; K_{ads} were Gilroy loam 4.1, Gilroy sediment 4.9, Keaton sandy loam 1.3, Biggs clay

17, German loamy sand 16, and MRID # 41441301 (this report) reported K_d value in Gilroy loam of 6.86)
165-4. Laboratory accumulation in fish (MRID # 40624302, 40624303)
Edible 15X, Non-edible 59X, Whole 34X after exposure to 0.24-0.30 ppm for 28 days

(2) Not Satisfied:

164-1. Terrestrial Field Dissipation

(3) Reserved;

164-5. Long Term Terrestrial Field Dissipation

166-1. Small Prospect.

166-2. Small Retrospect.

9. BACKGROUND :

Sandoz has submitted five terrestrial field studies in 1990, four in February, MRID 41384101, 41384102, 41384103, 41384104, and one in April 41461501. In February of 1991 two bare ground studies were submitted (Interim reports) MRID 41800701 and 41800702. Sandoz has requested that studies MRID 41384103 and 41384104 (Georgia and Alabama peanut crop studies) should not be included in the review and that the other five studies should suffice for determining guideline 164-1 requirements for turf use. (Letter from Melvin M. Graben, Manager, Product Registrations, Sandoz, enclosed)

10. DISCUSSION:

See attached DERS.

11. COMPLETION OF ONE-LINER:

Attached.

12. CBI INDEX:

Not applicable.

DATA EVALUATION RECORD
(DER 1)

SHAUGHNESSY No. 128993

COMMON NAME: Cyproconazole

CHEMICAL NAME: alpha-(4-Chlorophenyl)-alpha-(1-cyclopropylethyl)-
1H-1,2,4-triazole-1-ethanol

FORMULATION: 40% WG

DATA REQUIREMENT: 164-1 Terrestrial Field Dissipation

MRID No: 41384101, Addendum to previously submitted study.
Bade, T.R., Guirguis M., Dissipation of Cyproconazole in Soil After
Six Applications to Turf, performing laboratory Sandoz Crop
Protection Corporation, 1300 East Touhy Avenue, Des Plaines,
Illinois 60018

REVIEWED BY: Kevin L. Poff
Chemist EFGWB/EFED

Signature: *Kevin L. Poff*

Date:

APPROVED BY: Akiva Abramovitch, Ph.D.
Chemist EFGWB/EFED

Signature: *Akiva Abramovitch*

Date: 10/28/1991

CONCLUSIONS:

(1) Together studies MRID # 41384101 (this report) and study MRID # 40624301 (previously submitted unacceptable study) does not satisfy the terrestrial field 164-1 data requirement for the following reason:

(a) The anomalous results caused by frequent sample contamination make it difficult to accurately determine the dissipation rate of cyproconazole.

MATERIALS AND METHODS: (taken from MRID 40624301)

Cyproconazole (40 % WG, source unspecified) was applied in six foliar applications at 131 g ai/acre/application (1.73 lbs/acre total application) to a turf-covered field plot (10 x 100 feet) located on fairways of a golf course in Watsonville, California. The soil was a sandy loam (52% sand, 43% silt, 5% clay, 1.2% organic matter, pH 7.4, CEC 20 meq/100g). Applications were made at monthly intervals, beginning July 10, plot served as the control. The fairways were fertilized, irrigated, and maintained as per typical practice for golf course fairways. Soil cores (3/sampling interval; 0- to 10-, 10- to 20-, and 20- to 30- cm depths) were taken on each application date and at various intervals up to 122 days following the last application. Additional cores (30- to 40-, 40- to 50-, and 50- to 60-cm depths) were taken 1-122 days following the last application. Samples were stored frozen at an unspecified temperature for 5-10 months prior to analysis.

Soil samples were analyzed according to analytical method number AM-0818. The soil samples were hydrolyzed with 1 N HCL for 1 hour at 95°C, extracted with ethanol, and filtered. The filtrate was concentrated by rotary evaporation, 1 N HCL was added, and the extract was centrifuged. The extract was cleaned up with reverse phase HPLC and analyzed for cyproconazole using GC with phosphorus nitrogen detection. The detection limit was 0.01. Recovery samples from samples fortified at 0.10 or 0.20 ppm ranged from 70 to 100%.

RESULTS: (taken from MRID 40624301)

The registrant calculated half-life was 42.5 days when cyproconazole (40% WG) was applied once a month at 131 g ai/acre/application for 6 consecutive months to a turf-covered field plot (sandy loam soil) located in Watsonville, California. Cyproconazole was 1.3 ppm immediately following the last of six treatments, decreased to 0.23 ppm at 56 days, then increased to 0.45 ppm at 84 days and 0.78 ppm at 122 days posttreatment in the 0- to 10- cm soil depth. In the 10- to 20- cm soil depth, cyproconazole was not detected (<0.01 ppm) at all sampling intervals up to 99 days following the last application, then increased to 0.019-0.021 ppm at 122 days posttreatment. Cyproconazole was <0.01 ppm in the 20- to 30-cm soil depth and <0.01 ppm in the 30- to 60-cm depths at sampling intervals up to 122 days following the last application. Rainfall was 6.01 inches and air and soil temperatures were 29-107 and 42-76° F, respectively, from July 7, 1987 through April 5, 1988.

DISCUSSION:

Study MRID # 40624301 (previously submitted) was and still is unacceptable for a number of reasons, one of the major deficiencies was uncorrectable in that there were anomalous increases in the cyproconazole concentration in surface soil core samples collected at times well after the last application. These results occurred too frequently to accurately determine the dissipation rate of cyproconazole. Furthermore, no attempt was made to characterize and quantify degradates, no freezer storage stability was submitted, the study was conducted at only one test site, field test data were incomplete as well as the meteorological data.

This addendum (MRID # 41384101) attributed the uneven results (correlation coefficient 0.3939) as a contamination problem, but this explanation does not change the values and distribution of the anomalous data points. Furthermore, no attempt was made to identify and quantify major degradates, (non specific method of analysis); the recently submitted aerobic soil metabolism study (MRID No: 41474401) showed that triazolyl alanine (2-amino-3-(1-H1, 1, 2, 4-triazol-1-yl) propanoic acid was the only degradate produced, and in very nominal amounts. The previous reviewer was unaware of this fact because of the metabolism study being a recent submission. Freezer storage stability applicable to this study and others have been submitted as well as supplemental meteorological data.

RIN 0655-94

CYPROCONAZOLE REVIEWS

Page ___ is not included in this copy.

Pages 10 through 11 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) _____.
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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
(DER 2)

SHAUGHNESSY No. 128993
COMMON NAME: Cyproconazole
CHEMICAL NAME: alpha-(4-Chlorophenyl-alpha-(1-cyclopropylethyl)-
1H-1,2,4-triazole-1-ethanol
FORMULATION: 40% WG
DATA REQUIREMENT: 164-1 Terrestrial Field Dissipation

MRID No: 41384102
Guirguis M., Popp J., Bade T.R., Dissipation and Mobility of
Cyproconazole in Soil After Four Applications to Turfgrass in
Maryland, prepared by Sandoz Crop Protection Corporation 1300 East
Toughy Avenue, Des Plaines, Illinois 60018

REVIEWED BY: Kevin L. Poff
Chemist EFGWB/EFED

Signature: *K. L. Poff*

Date:

APPROVED BY: Akiva Abramovitch, Ph.D.
Chemist EFGWB/EFED

Signature: *Akiva Abramovitch*

Date: AUG 28 1991

CONCLUSIONS:

(1) Study MRID # 41384102 does not satisfy the Terrestrial Field
Dissipation (164-1) data requirement for the following reasons:

(a) The data were too variable in the 0-10 cm soil segments to
accurately determine the dissipation rate of cyproconazole.

(b) Cyproconazole detected frequently at depths greater than 10 cm
was not included in data points used for half-life calculations
and/or discussion.

MATERIALS AND METHODS:

Cyproconazole (40% WG, source unspecified) was applied in four broadcast sprays at 0.381 lb ai/A/application to turfgrass on a golf course located in Salisbury, Maryland. The soil was a sandy loam (54% sand, 32% silt, 14% clay, 3.2% organic matter, pH 5.7, CEC 3.8 meq/100g). Applications were made at 14 day intervals beginning June 20, 1988. The fairways were fertilized, irrigated, and maintained as per typical practice for golf course fairways. The check plot was located 371 feet away from the treated plots. Soil cores (4/sampling interval; 0- to 30-cm depth) were taken before the first application and immediately after each application up to 28 days after the last application. 0- to 60-cm cores were taken on days 42 and 56, 0- to 90-cm were taken for the rest of the sampling dates. Soil samples were analyzed according to analytical method number AM-0818. The soil samples were hydrolyzed with 1 N HCL for 1 hour at 95°C, extracted with ethanol, and filtered. The filtrate was concentrated by rotary evaporation, 1 N HCL was added, and the extract was centrifuged. The extract was cleaned up with a SPE reverse phase column and analyzed for cyproconazole using GC with phosphorus nitrogen detection. The detection limit was 0.01. Recovery efficiencies from soil samples fortified at 0.10 or 0.20 ppm averaged from 92.75±16.8% (N=6) and 100.8 ± 15.5% (N=10) respectively.

RESULTS:

The registrant calculated half-life was 192 days when cyproconazole (40% WG) was applied 4x's at 14 day intervals at 0.381 lbs. ai/A/application to a turf plot located in Salisbury, Maryland. In the 0- to 10-cm soil depth, cyproconazole levels peaked at 1.58 ppm on day 14 after the last application and declined to 0.33 ppm on day 350 after the last application. Cyproconazole was detected at depths 10-20 cm, post 4th application (0 day) as well as day 1, 3, 7, 14, 28, 43, 56, 96, 211, 212, 244, 266, 294, and 350 from levels of 0.01- 0.03 ppm. Cyproconazole was detected at 20-30 cm post 4th day (0 day) application as well as days 7, 28, 266 from levels of 0.01-0.07 ppm. Air temperatures were 30-94°F from April 1 1988 through September 30 1989. Rainfall and irrigation were 25.47 inches from May 25, 1988 through November 29, 1988. Rainfall only, from December 1, 1988 through April 19, 1989 was 16.77 inches. Soil temperatures from April 1, 1988 through September 30, 1989 ranged 25°F-94°F.

DISCUSSION:

(1) Cyproconazole was detected at depths 10-20 cm, post 4th application (0 day) as well as day 1, 3, 7, 14, 28, 43, 56, 96, 211, 212, 244, 266, 294, and 350 from levels of 0.01- 0.03 ppm. Cyproconazole was detected at 20-30 cm post 4th day (0 day) application as well as days 7, 28, 266 from levels of 0.01-0.07 ppm. This represents a significant amount of material that was not accounted for in the half-life calculation.

RIN 0655-94

CYPROCONAZOLE REVIEWS

Page _____ is not included in this copy.

Pages 15 through 22 are not included.

The material not included contains the following type of information:

- Identity of product inert ingredients.
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 - Description of the product manufacturing process.
 - Description of quality control procedures.
 - Identity of the source of product ingredients.
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DATA EVALUATION RECORD
(DER 3)

SHAUGHNESSY No. 128993
COMMON NAME: Cyproconazole
CHEMICAL NAME: alpha-(4-Chlorophenyl-alpha-(1-cyclopropylethyl)-
1H-1,2,4-triazole-1-ethanol
FORMULATION: 40% WG
DATA REQUIREMENT: 164-1 Terrestrial Field Dissipation

MRID No: 41461501
Guirguis M., Dissipation and Mobility of Cyproconazole in Soil
After Four Applications to Turfgrass in Louisiana, performing
laboratory Sandoz Crop Protection Corporation, 1300 East Toughy
Avenue, Des Plaines, Illinois 60018

REVIEWED BY: Kevin L. Poff
Chemist EFGWB/EFED

Signature: *K L Poff*

Date:

APPROVED BY: Akiva Abramovitch, Ph.D.
Chemist EFGWB/EFED

Signature: *Akiva Abramovitch*

Date: AUG 28 1991

CONCLUSIONS:

(1) Study MRID # 41461501 does not satisfy the Terrestrial Field
Dissipation (164-1) data requirement for the following reason:

(a) There is too great a disparity between the short terrestrial
field dissipation half-life and great stability indicated in the
laboratory studies.

(2) A satisfactory explanation is required to clear up the
discrepancy between field and laboratory studies to render the
study acceptable.

(3) The registrant calculated half-life was 21 days when
cyproconazole (40%WG) was applied in four broadcast sprays at 0.381
lb a.i./A/application to turfgrass. In the 0- to 10-cm soil depth,
cyproconazole levels peaked at 0.53 ppm on day 3 after the last
application and declined to < 0.01 ppm on day 186 after the last
application.

MATERIALS AND METHODS:

Cyproconazole (40% WG, source unspecified) was broadcast applied in four sprays at the maximum recommended use rate of 0.381 lb a.i./A/application to turfgrass on a research farm in Rosa Louisiana. The soil was a silt loam consisting of 26% sand, 57% silt, 17% clay, 0.7% organic matter, pH 6.3, CEC 8.4 meq/100g. Applications were made at 14 day intervals beginning March 13, 1989. No pesticides were used on the field since 1983. The check plot was located 350 feet away from the treated plots. 0- to 30-cm cores were taken from the treated plots before the first application, immediately after each application and 1, 3, 7, 14, and 28 days after the last application. 0- to 60-cm cores were taken on days 42 and 56, 0- to 90-cm cores were taken for the rest of the sampling dates. Soil samples were analyzed according to analytical method number AM-0818. The soil samples were hydrolyzed with 1 N HCL for 1 hour at 95°C, extracted with ethanol, and filtered. The filtrate was concentrated by rotary evaporation, 1 N HCL was added, and the extract was centrifuged. The extract was cleaned up with a SPE reverse phase column and analyzed for cyproconazole using GC with phosphorus nitrogen detection. The detection limit was 0.01. Recovery efficiencies from soil samples fortified at 0.10 or 0.20 ppm averaged from $76.4 \pm 5.1\%$ (N=12) and $85.6 \pm 10.7\%$ (N=7) respectively.

RESULTS:

The registrant calculated half-life was 21 days when cyproconazole (40% WG) was applied 4x's at 14 day intervals at 0.381 lbs. ai/A/application to a turf plot located in Rosa, Louisiana. In the 0- to 10-cm soil depth, cyproconazole levels peaked at 0.53 ppm on day 3 after the last application and declined to < 0.01 ppm on day 186 after the last application. Cyproconazole was detected at 0.01 ppm, 10-20 cm, after the last application. Air temperatures were 5°-95° F from March 10, 1989 through December 27, 1989. Rainfall was 43.24 inches from March 1989 through December 27, 1989. Irrigation was 36 inches from April 24, 1989 through December 25, 1989. Soil temperatures (1 inch depth) from March 13, 1989 through January 14, 1990 ranged 27.6°F-108.5°F.

DISCUSSION:

Cyproconazole is stable to hydrolysis at Ph 5, 7, 9 for 40 days at 25°C, stable to aqueous photolysis, 40 days in 8-10 hours of sunlight/day, stable to aqueous photolysis at having a half-life of >37 days in loam soil with 8-10 hours of sunlight/day, and stable to aerobic soil metabolism with a half-life of >693 days. With this laboratory data very little abiotic degradation should take place and no biotic degradation should occur. A physical process is influencing the dissipation of cyproconazole that can not be addressed in a field dissipation study (ie., volatilization: vapor pressure of cyproconazole is 2.6×10^{-7} torr, Henry's constant: 7.1×10^{-10} atm*m³/mol, in conjunction with moist hot conditions could lead to gaseous loss of product or there could be loss attributed to runoff of soluble or sorbed residues).

RIN 0655-94

CYPROCONAZOLE REVIEWS

Page _____ is not included in this copy.

Pages 25 through 31 are not included.

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DATA EVALUATION RECORD
(DER 4)

SHAUGHNESSY No. 128993

COMMON NAME: Cyproconazole

CHEMICAL NAME: alpha-(4-Chlorophenyl-alpha-(1-cyclopropylethyl)-
1H-1,2,4-triazole-1-ethanol

FORMULATION: 40% WG

DATA REQUIREMENT: 164-1 Terrestrial Field Dissipation

MRID No: 41800701

Bade T.R., Volume 1, Interim Report on Dissipation and Mobility of
Cyproconazole in Soil after Four Applications to Bare Ground in
Oregon, work completed by Collins Agricultural Consultants Inc.,
Hillsboro, Oregon and Harris Environmental Technologies, Inc.,
Lincoln, NE.

REVIEWED BY: Kevin L. Poff
Chemist EFGWB/EFED

Signature: *Kevin L. Poff*

Date:

APPROVED BY: Akiva Abramovitch, Ph.D.
Chemist EFGWB/EFED

Signature: *Akiva Abramovitch*

Date:

AUG 28 1991

CONCLUSIONS:

(1) Study MRID #41800701 may be made acceptable when the final
report is submitted and could be used to partially satisfy the
terrestrial field dissipation (164-1) data requirement.

(2) The registrant calculated half-life was 213 days when
cyproconazole (40% WG) was applied 4x's at 14 day intervals at
0.384 lbs. ai/A/application to a bareground plot. In the 0- to 10-
cm soil depth, cyproconazole levels (mean) increased from 0.21 ppm
post first application to 0.71 ppm post fourth application. The
mean levels increased in the 0- to 10-cm level from 0.73 ppm on day
7 and decreased to 0.27 ppm on day 180 after last application.

MATERIALS AND METHODS:

Cyproconazole (40% WG, source unspecified) was mixed with water and applied in four sprays at the maximum recommended use rate of 0.384 lb a.i./A/application to a bareground plot in Hillsboro, Oregon. The soil was a silty clay loam consisting of 16% sand, 56% silt, 28% clay, 2.1% organic matter, Ph 5.5, CEC 9.4 meq/100g. Applications were made at 14 day intervals beginning September 26, 1989. Karmex, Hoelan, and MCPA was used in 1985, Atrazine and Eradicane in 1986, 1987 the same as 1985, 1988 the same as 1986 and 1989 the same as 1985. Roundup was used periodically to control weeds after the test initiation. The untreated plot was located 150 feet away from the treated plots. 0- to 30-cm cores were taken from the treated plots before the first application, immediately after each application and 3, 7, 14, and 30 days, 2, 3, 4, 6, and 9 months after the last application. The 6 and 9 month samples were taken as a 0-90-cm core. Soil samples were analyzed according to analytical method number AM-0818. The soil samples were hydrolyzed with 1 N HCL for 1 hour at 95°C, extracted with ethanol, and filtered. The filtrate was concentrated by rotary evaporation, 1 N HCL was added, and the extract was centrifuged. The extract was cleaned up with a SPE reverse phase column and analyzed for cyproconazole using GC with phosphorus nitrogen detection. The detection limit was 0.01. Recovery efficiencies from soil samples fortified at 0.10 or 0.50 ppm averaged from $86.7 \pm 14.8\%$ (N=13) and $82.8 \pm 12.0\%$ (N=6) respectively.

RESULTS:

The registrant calculated half-life was 213 days when cyproconazole (40% WG) was applied 4x's at 14 day intervals at 0.384 lbs. ai/A/application to a bareground plot located in Hillsboro, Oregon. In the 0- to 10-cm soil depth, cyproconazole levels (mean) increased from 0.21 ppm post first application to 0.71 ppm post fourth application. The mean levels increased in the 0- to 10-cm level from 0.73 ppm on day 7 and decreased to 0.27 ppm on day 180 after last application. Cyproconazole was detected in cores 10-20cm and 20-30cm at levels of 0.01- 0.07 ppm at various sampling intervals. Cyproconazole was detected in the untreated plot (0-10cm) at 0.02 ppm 7 days after the first treatment, 0.01 ppm (0-10cm) post second treatment, 0.02 ppm (10-20cm) post fourth treatment and 0.03 ppm 14 days after the last treatment. Air temperatures were 16°-101.3°F from September 1, 1989 through September 1, 1990. Rainfall was 35.9 inches from September 1, 1989 through September 30, 1990. Irrigation was 9.4 inches from September 23, 1989 through September 22, 1990. Soil temperatures (2-3 inch depth) from September 1, 1989 through September 30, 1990 ranged from 32° (2 inch)-88.2°F (3 inch).

DISCUSSION:

Study MRID # 41800701 could be used to partially satisfy the terrestrial field dissipation (164-1) data requirement if the final report submitted is acceptable. This study would partially satisfy the data requirement by providing information on the dissipation of cyproconazole on a bareground plot to support turf use.

RIN 0655-94

CYPROCONAZOLE REVIEWS

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Pages 34 through 40 are not included.

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 - 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.
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DATA EVALUATION RECORD
(DER 5)

SHAUGHNESSY No. 128993
COMMON NAME: Cyproconazole
CHEMICAL NAME: alpha-(4-Chlorophenyl-alpha-(1-cyclopropylethyl)-
1H-1,2,4-triazole-1-ethanol
FORMULATION: 40% WG
DATA REQUIREMENT: 164-1 Terrestrial Field Dissipation

MRID No: MRID No: 41800702
Ali, S., Volume 2 Interim Report on Dissipation and Mobility of
Cyproconazole in Soil after Four Applications to Bare Ground in
North Carolina, performing laboratory Sandoz Crop Protection
Corporation, 1300 East Toughy Avenue, Des Plaines, Illinois 60018

REVIEWED BY: Kevin L. Poff
Chemist EFGWB/EFED

Signature: *[Handwritten Signature]*

Date:

APPROVED BY: Akiva Abramovitch, Ph.D.
Chemist EFGWB/EFED

Signature: *[Handwritten Signature]*

Date: AUG 28 1991

CONCLUSIONS:

(1) Study MRID #41800702 may be made acceptable when the final report is submitted and could be used to partially satisfy the terrestrial field dissipation (164-1) data requirement.

(2) The estimated half-life was 173 days when cyproconazole (40% WG) was applied 4x's at 14 day intervals at 0.384 lbs. ai/A/application to a bareground plot. In the 0- to 10-cm soil depth, cyproconazole levels (mean) decreased from 0.48 ppm on day 14 to 0.043 ppm on day 270. Cyproconazole was detected at deeper depths in pre first (10-20cm), 0.02 ppm, post second, (10-20cm), 0.02 ppm, day three (20-30cm), 0.01 ppm and month 2 (10-20cm), 0.01 ppm.

MATERIALS AND METHODS:

Cyproconazole (40% WG, source unspecified) was mixed with water and applied in four sprays at the maximum recommended use rate of 0.384 lb a.i./A/application to a bareground plot in Hogwood, Halifax County, North Carolina. The soil at 0-12 inches was sandy loam consisting of 58% sand, 30% silt, 12% clay, 2.0% organic matter, pH 5.5, CEC 3.8 meq/100g. Applications were made at the shortest recommended interval of 14 days, starting September 9, 1989 and ending October 21, 1989. Atrazine and Lasso was used 5 years prior, 2,4-D amine salt was used 4 years prior, afterwards no other pesticides were applied. Glyphosate was applied during test duration on July 29, August 26, October 7, November 4, 1989, February 21 and June 8, 1990. 0- to 10-, 10- to 20- and 20- to 30-cm depth cores were taken at all sampling intervals on pre first treatment, post first, post second, post third, post fourth, 3 days after last treatment, 7, 14, 30, 2 months after last treatment as well as 3, 4, 6, and 9 months. Soil samples were analyzed according to analytical method number AM-0818. The soil samples were hydrolyzed with 1 N HCL for 1 hour at 95°C, extracted with ethanol, and filtered. The filtrate was concentrated by rotary evaporation, 1 N HCL was added, and the extract was centrifuged. The extract was cleaned up with reverse phase column chromatography and analyzed for cyproconazole using GC with phosphorus nitrogen detection. The detection limit was 0.01. Recovery efficiencies from soil samples fortified at 0.10 or 0.50 ppm averaged from $79.4 \pm 8.7\%$ (N=15) and $91.45 \pm 20.7\%$ (N=6) respectively.

RESULTS:

The estimated half-life was 173 days when cyproconazole (40% WG) was applied 4x's at 14 day intervals at 0.384 lbs. ai/A/application to a bareground plot located in Hogwood, Halifax County, North Carolina. In the 0- to 10-cm soil depth, cyproconazole levels (mean) increased from 0.48 ppm on day 14 to 0.043 ppm on day 270. Cyproconazole was detected at deeper depths in pre first (10-20cm), 0.02 ppm, post second, (10-20cm), 0.02 ppm, day three (20-30cm), 0.01 ppm and month 2 (10-20cm), 0.01 ppm. Cyproconazole was detected in the untreated plot (10cm-20cm) at 0.02 ppm 3 days after the first treatment.

DISCUSSION:

Study MRID # 41800702 could be used to partially satisfy the terrestrial field dissipation (164-1) data requirement if the final report submitted is acceptable. This study would partially satisfy the data requirement by providing information on the dissipation of cyproconazole on turf.

RIN 0655-94

CYPROCONAZOLE REVIEWS

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 - 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.
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DATA EVALUATION RECORD
(DER 6)

SHAUGHNESSY No. 128993
COMMON NAME: Cyproconazole
CHEMICAL NAME: alpha-(4-Chlorophenyl-alpha-(1-cyclopropylethyl)-
1H-1,2,4-triazole-1-ethanol
FORMULATION: 40% WG
DATA REQUIREMENT: 164-1 Terrestrial Field Dissipation

MRID No: 41384105
Rosas M., Storage Stability of Cyproconazole in Soil, performing
laboratory, Analytical Chemistry and Formulations, Sandoz Crop
Protection Corporation, 1300 East Touhy Avenue, Des Plaines,
Illinois 60018

REVIEWED BY: Kevin L. Poff Signature: *Kevin L. Poff*
Chemist EFGWB/EFED
Date: .

APPROVED BY: Akiva Abramovitch, Ph.D. Signature: *Akiva Abramovitch*
Chemist EFGWB/EFED
Date: AUG 28 1991

CONCLUSIONS:

- (1) Study MRID # 41384105 provides acceptable data on the storage stability of Cyproconazole in soil.
- (2) Cyproconazole was analyzed before freezing (Group 1 samples) at below 20°F and 14 months afterward (Group 2 samples). There was no significant difference found in the residue levels of the two groups after SAS TTEST was performed, ($P < 0.05$). This study indicates that cyproconazole is stable to freezer storage at below 20°F for periods up to 14 months.

MATERIALS AND METHODS:

Cyproconazole (40 WG) was applied 6x's to turf grass in 1 month intervals at the maximum recommended use rate in a previously submitted field dissipation study MRID # 40624301. Soil samples were collected prior to the first application and immediately after at 1, 14, 28, 42, 56, 70, 84, 99, and 122 days. Samples were then shipped to Sandoz and kept frozen until analysis. At analysis, the soil cores were cut into 10 cm sections, composited in plastic bags, returned to the below 20°F freezer and again reanalyzed 14 months later.

RESULTS:

Cyproconazole (40 WG) in soil samples taken from a terrestrial field dissipation study (MRID# 40624301) was stored frozen at below 20°F for 14 months and then reanalyzed for cyproconazole residue. A comparison of the before and after storage concentrations of cyproconazole by SAS TTEST found no significant differences between the two. This indicates that cyproconazole is stable under frozen storage conditions at below 20°F for periods of 14 months.

DISCUSSION:

(1) Although a non-specific method of analysis was used for the detection of cyproconazole the stability of the compound demonstrated in the laboratory studies would generally indicate that it would remain stable at refrigerated temperatures.

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CYPROCONAZOLE REVIEWS

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