4-12-94

DP Barcode :D180931
PC Code No. :127201
EFGWB Out :

TO: Cynthia Giles Parker
Product Manager PM 22
Registration Division (H7505C)

FROM: Akiva Abramovitch, Ph.D., Head
Environmental Chemistry Review Section #3
Environmental Fate & Ground Water Branch/EFED (H7507C)

THRU: Henry Jacoby, Chief Henry Jacoby 4/12/94
Environmental Fate & Ground Water Branch/EFED (H7507C)

Attached, please find the EFGWB review of...

Reg./File # :030262

Common Name :Triadimenol

Product Name :Baytan, Bayfidan, Summit

Company Name :Miles, Inc.

Purpose :Review of 164-1 study to support registration of triadimenol
Type Product :Fungicide Action Code: 576 Review Time: 2.0 days

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

161-1			162-4			164-4			166-1		
161-2			163-1			164-5			166-2		
161-3			163-2			165-1			166-3		
161-4			163-3			165-2			167-1		
162-1			164-1	41686103; 42403301	N	165-3			167-2		
162-2			164-2			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:

Triadimenol.

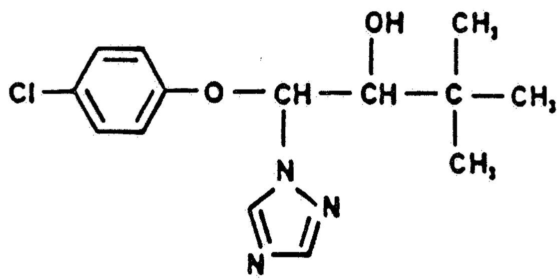
Chemical name:

1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanol.
Beta-(4-chlorophenoxy)-alpha-(1,1,-dimethylethyl)-1H-1,2,4-triazole-1-ethanol.

Trade name(s):

Baytan, Bay KWG 0519, Bayfidan, and Summit.

Structure:



Formulations:

Emulsifiable concentrate, flowable, granular, seed dressing, water dispersible granules, water-oil emulsion, and wettable powder.

Physical/Chemical properties:

Molecular formula:	$C_{14}H_{18}ClN_3O_2$.
Molecular weight:	295.8.
Physical state:	Colorless crystals.
Melting point:	121-127 °C.
Vapor pressure (20 °C):	<1 mPa.
Solubility (20 °C):	95 mg/L.

2. TEST MATERIAL:

Study 1: Active ingredient.

3. STUDY/ACTION TYPE:

Review of a terrestrial field dissipation study.

2

4. <u>STUDY IDENTIFICATION</u>:

Grace, T.J., and K.S. Cain. 1991. Dissipation of triadimenol in California soils. Performing Laboratory Project IDs: ML022101, 89.020, 89.095, 892010.1-2, 89-0080. Submitting Laboratory Project ID: BT830089R01. Mobay Report No. 100151. Unpublished study performed by Plant Sciences, Inc., Watsonville, CA, Siemer and Associates, Inc., Fresno, CA, and Ricerca, Inc., Painesville, OH; and submitted by Mobay Corporation, Kansas City, MO. (42403301)

Carey, R.O. 1990. Subsurface soil investigation report, Mobay Corporation, Chualar River Road, Monterey County, CA. Mobay Project ID: ML022101. Mobay Report No. 100061. Unpublished study performed by Kleinfelder, Inc., Fresno, CA, and submitted by Mobay Corporation, Kansas City, MO. (41686103)

5. <u>REVIEWED BY</u>:

David Edelstein, Soil Scientist
Review Section #3
EFGWB/EFED/OPP

Signature: David Edelstein

Date: MAR 28 1994

6. <u>APPROVED BY</u>:

Akiva Abramovitch, Chief
Review Section # 3
EFGWB/EFED/OPP

Signature: Akiva Abramovitch

Date: MAR 28 1994

7. <u>CONCLUSIONS</u>:

164-1: <u>Terrestrial field dissipation</u> (MRID 42403301, 41686103; not acceptable at this time)

This study appears to provide a scientifically valid description of triadimenol dissipation under typical use conditions in wheat fields. However, these results cannot be generalized due to the lack of explanation for the following observations:

1) Although the study reports half-lives for triadimenol in Fresno and Watsonville, the results of this study give no indication of the dissipation/degradation route of triadimenol. No degradates were identified to indicate <u>in situ</u> chemical breakdown of triadimenol, and no evidence was provided to indicate off-site movement. There is no explanation of the reported drop in triadimenol recovery over time as reported here.

2) Although other studies reviewed in this package (aged column leaching, MRID 42356601, field dissipation, MRID 42242701) demonstrate that triadimenol is mobile, there are virtually no detections of triadimenol below the surface layer in this study. The registrant should identify the particular conditions in this study that prevented downward movement of triadimenol.

Submitted data indicate that triadimenol dissipated with half-lives of 450 and 76.7 days in plots ranging in texture from sand to sandy loam soil located in Chualar and Fresno, California, respectively, that were planted to wheat and treated at 0.25 lb ai/A with a postemergent application of a 25% DF (dry flowable) formulation. Triadimenol residues were variable, with no discernible pattern, in similar plots that were treated with three applications of the DF at 0.25 lb ai/A/application (total 0.75 lb ai/A) applied at 7-day intervals. The degradate chlorophenoxymethyltriazole (CPMT) was not detected in soil from the single or multiple application plots.

PREVIOUSLY ACCEPTED DATA

161-1: Hydrolysis (EFGWB #295,296; accepted 3/29/83)
Triadimenol was stable in sterile aqueous solutions buffered at pH 4.5-9.2 and incubated in the dark at 20 C and 40 C.

161-2: Photolysis in water (EFGWB #295,296; accepted 3/29/83)
Triadimenol in distilled water degraded with a half-life of 36 hrs. when irradiated with artificial light (sun lamps and black lights). CO_2 was the only identified degradate.

161-3: Photolysis on soil (EFGWB #295,296; accepted 3/29/83)
Triadimenol was stable on silty clay loam soil (0% sand, 66% silt, 34% clay, 2.4% organic matter, pH 5.9, CEC 32 meq/100g) that was irradiated with artificial light (sun lamps and black light). Degradation rates were similar in the light and in dark controls.

162-1: Aerobic soil metabolism (EFGWB #295,296; accepted 3/29/83; MRID 42224104 (41686102); accepted in triadimefon package of 3/94)
As triadimenol is the primary degradate of triadimefon, it is possible to use the aerobic soil metabolism studies of triadimefon to determine the behavior of triadimenol in aerobic soil. Triadimenol half-lives in both studies were approximately 8-9 months. Major degradates of triadimenol included: 4-chlorophenoxy-1,2,4-triazol-1-yl-methane (chlorophenoxymethyltriazole; CPMT), and 1H-1,2,4-triazole.

162-2: Anaerobic soil metabolism (EFGWB #295,296; accepted 3/29/83; MRID 41686101; acceptable; MRID 42401201; acceptable)

In both recent studies and in the earlier study of the degradation of triadimefon incubated under anaerobic conditions, the only identified degradate was triadimenol. No further degradation of triadimenol was observed under anaerobic conditions.

163-1: Mobility/ Adsorption/desorption (EFGWB #295,296; accepted 3/29/83; MRID 42356601; supplemental, reviewed 3/94)
Based on column leaching studies, aged (30 days) triadimefon [1-(4-chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone] residues and the degradate triadimenol were determined to be mobile in columns of sand (3.7% organic matter), sandy loam (1.0% organic matter), silt loam (2.9% organic matter) and clay loam (2.2% organic matter) soils that were

4

treated with triadimefon residues and leached with 20 inches of 0.01 M calcium chloride solution. At the initiation of leaching, parent triadimefon was 57% of the aged residues. While triadimefon and triadimenol (Isomers I and II) were only slightly mobile in the columns of sand and silt loam, remaining approximately in the upper half of the 30-cm columns, triadimefon and triadimenol were mobile in the columns of sandy loam and clay loam. In the columns of sandy loam and clay loam, triadimefon and triadimenol were found throughout the columns and in the leachate. The greatest mobility was observed in the clay loam column, and the least in the sand column. The study author ascribes this result to differences in organic matter content among the columns. However, organic matter content was not the only difference among soil columns.

Although this study provides valid supplemental data demonstrating the potential mobility of triadimefon and triadimenol, there is no sound explanation of conditions that may increase or decrease triadimefon and triadimenol mobility. The study author proposes organic matter content as determining triadimefon mobility, but triadimenol and other residues were more mobile in a clay loam with 2.2% organic matter than in a sandy loam with 1.0% organic matter. While organic matter does seem to have some relationship to triadimefon and triadimenol mobility, other factors are clearly involved. However, accepted mobility data for triadimenol does indicate that triadimenol mobility may be controlled by soil organic matter content under some circumstances.

In an earlier study, triadimenol was shown to be moderately mobile in a Kansas loam (3% o.m., Kd = 5.26), Hagerstown silty clay (2.1% o.m., kd = 2.37) and a Florida sand (3.7% o.m., Kd = 4.05).

165-4: <u>Bioaccumulation in fish</u> (EFGWB #80743; accepted 1/11/89) Triadimenol accumulated only slightly in fish, with maximum bioconcentration factors of 5.4X, 44X, and 27X in edible tissues, nonedible tissues, and whole fish, respectively.

ENVIRONMENTAL FATE ASSESSMENT

Based on laboratory studies and the submitted field dissipation study, triadimenol is stable in sterile water. Although it may photolyze in aqueous solution, it is stable to photolysis on soil. The primary route of triadimenol degradation appears to be microbial activity. Triadimenol degraded slowly in aerobic soil in the laboratory, with a reviewer calculated half-life of 236 days; 4-chlorophenoxy-1,2,4-triazol-1-yl-methane (chlorophenoxymethyltriazole; CPMT) is believed to be a degradate of triadimenol. Triadimenol does not degrade under anaerobic conditions.

Triadimenol appears to be mobile, (Kd = 2.37 - 5.26) but the soil conditions that exacerbate or mitigate mobility are not known. The data indicate that soil texture will be a poor guide to the mobility of triadimenol: triadimenol was most mobile in a silty clay soil in a batch equilibrium study. The results of the batch equilibrium study suggest that soil organic matter content is the key factor in controlling the mobility of triadimenol, but this is not certain. A submitted aged column leaching study that monitored triadimenol as a degradate of triadimefon did not show a consistent correlation between mobility and organic matter. Triadimenol mobility may well be determined by the rate or volume of water movement through the soil or some other factor.

In the submitted field study, triadimenol persistence corresponded roughly to the laboratory estimate of triadimenol biodegradation. Field half-lives were reported to range from 76 to 450 days. However, triadimefon was less mobile than expected, with little residue penetrating below the 0- to 6-inch layer and virtually none going below 12 inches. This is in contrast to a field study of triadimefon, where parent triadimefon reached a depth of 2 feet and triadimenol reached a depth of 4 feet. Also, the field study of triadimenol was flawed in that no dissipation route was identified; while triadimenol did not appear to leach out of the test area during the field study, there was also no sign of degradation, so it is not clear what the dissipation route of triadimenol was.

Triadimenol does not accumulate in fish.

8. RECOMMENDATIONS:

1) The field dissipation study reviewed here may be upgraded if the registrant can provide credible hypotheses for the dissipation of triadimenol observed in this study. Triadimenol concentrations declined throughout the field study period and no dissipation route was identified. Based on laboratory and data, the only known dissipation route for triadimenol is leaching, but there was no evidence of leaching in the submitted field study. The results suggest that triadimenol does not leach under the study conditions; it is important to identify environmental factors and management practices that exacerbate or mitigate triadimenol leaching in typical use situations, as well as to identify the dissipation route for triadimenol in this study.

9. BACKGROUND:

A. Introduction

B. Directions for Use

Triadimenol is a systemic fungicide registered for use in the control of a wide variety of fungal infestations (rusts, smuts, blight, powdery mildew, rots) in terrestrial food crops (grains), and as a seed treatment for corn and grain sorghum. Foliar treatments are used for diseases affecting various other terrestrial food crops (bananas, cereals, coffee, deciduous fruit, grapes, vegetables). Single active ingredient formulations include emulsifiable concentrate, flowable, granular, seed dressing, water dispersible granules, water-oil emulsion, and wettable powder. Multiple active ingredient formulations for seed dressing applications include fuberidazol and imazalil.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

Refer to attached reviews.

11. COMPLETION OF ONE-LINER:

The one-liner has been updated and is attached.

12. CBI APPENDIX:

No claim of confidentiality is made for the data in the reviewed study.

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
TRIADIMENOL
Last Update on February 23, 1994
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

LOGOUT	Reviewer:	Section Head:	Date:

Common Name:TRIADIMENOL
Smiles Code:
PC Code # :127201 CAS #:55219-65-3 Caswell #:

Chem. Name :ß-(4-CHLOROPHENOXY)-ß-(1,1-DIMETHYLETHYL)-1H-1,2,4-TRIAZOLE-1-ETHANOL
Action Type:SYSTEMIC FUNGICIDE

Trade Names:TRIADIMENOL; BAY KWG 0519; BAYFIDAN; SUMMIT
(Formul'tn):SEED DRESSING: WP, EC, EMUL-WATER, DRY POWDER, DRY FLOWABLE
Physical State:

Use :CONTROL OF SMUT AND BUNT OF WHEAT, LOOSE AND COVERED SMUT OF
Patterns :BARLEY, POWDERY MILDEW, RUST, LEAF SPOT AND TAKE-OFF OF
(% Usage) :WHEAT AND BARLEY
:

Empirical Form: $C_{14}H_{18}N_3O_2Cl$
Molecular Wgt.: 295.76 Vapor Pressure: 7.50E -6 Torr
Melting Point : °C Boiling Point: °C
Log Kow : 2.90 TO 3.12 pKa: @ °C
Henry's : E Atm. M3/Mol (Measured) 3.07E -8 (calc'd)

Solubility in ...					Comments
Water	95.00E	ppm	@20.0	°C	
Acetone	E	ppm	@	°C	
Acetonitrile	E	ppm	@	°C	
Benzene	E	ppm	@	°C	
Chloroform	E	ppm	@	°C	
Ethanol	E	ppm	@	°C	
Methanol	E	ppm	@	°C	
Toluene	E	ppm	@	°C	
Xylene	E	ppm	@	°C	
	E	ppm	@	°C	
	E	ppm	@	°C	

Hydrolysis (161-1)
[V] pH 5.0:STABLE
[V] pH 7.0:STABLE
[V] pH 9.0:STABLE
[ ] pH :
[ ] pH :
[ ] pH :

8

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
TRIADIMENOL
Last Update on February 23, 1994
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Photolysis (161-2, -3, -4)
[V] Water:36 HOURS, ARTIF. SUNLIGHT
[ ] :
[ ] :
[ ] :

[V] Soil :STABLE
[ ] Air :

Aerobic Soil Metabolism (162-1)
[V] 8 - 9 MONTHS
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Anaerobic Soil Metabolism (162-2)
[V] EVEN MORE STABLE THAN IN
[ ] AEROBIC SOILS
[ ]
[ ]
[ ]
[ ]
[ ]

Anaerobic Aquatic Metabolism (162-3)
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Aerobic Aquatic Metabolism (162-4)
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

9

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
TRIADIMENOL
Last Update on February 23, 1994
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Soil Partition Coefficient (Kd) (163-1)

[ ]	SOIL	%OM	K
[V]	KANSAS LOAM	3.0	5.26
[V]	HAGERSTOWN SiCl	2.1	2.37
[V]	FLORIDA SAND	3.7	4.05
[ ]			
[ ]			

Soil Rf Factors (163-1)
[V] 0.16 KANSAS SILTY CLAY
[V] 0.58 OREGON SANDY LOAM
[ ]
[ ]
[ ]
[ ]

Laboratory Volatility (163-2)
[ ]
[ ]

Field Volatility (163-3)
[ ]
[ ]

Terrestrial Field Dissipation (164-1)
[S] 220-400 DAYS IN TESTS IN INDIANA, KANSAS, GEORGIA, AND
[ ] CANADA.
[S] 76-450 days in Fresno and Watsonville. No leaching reported
[ ] below 12 inches for triadimenol as parent.
[V] (Triadimefon study) As a degradate, triadimenol leached to
[ ] 48 inches
[ ]
[ ]
[ ]
[ ]

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

Forestry Dissipation (164-3)
[ ]
[ ]

10

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
TRIADIMENOL
Last Update on February 23, 1994
[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)
[ ]
[ ]

Accumulation in Irrigated Crops (165-3)
[ ]
[ ]

Bioaccumulation in Fish (165-4)
[V] BLUEGILL SUNFISH BCF: EDIBLE=5.4 X; NONEDIBLE=44; WHOLE =
[ ] 27 X

Bioaccumulation in Non-Target Organisms (165-5)
[ ]
[ ]

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
TRIADIMENOL
Last Update on February 23, 1994
[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

KWG 1342 (isomers I and II) comprised 23% of the residue recovered from edible fish portions and 37% in non-edible.
P-chlorophenol
C02 (only identified product in aqueous photolysis)

12

Comments

Baytan is a degradation product of bayleton; the ketone group in bayleton is reduced to an alcohol, forming Baytan.

References: FARM CHEMICALS HANDBOOK; EFGWB REVIEWS
Writer : PJH

13

DATA EVALUATION RECORD

STUDY 1

CHEM 127201 Triadimenol §164-1

FORMULATION--11--DRY FLOWABLE (DF)

STUDY ID 42403301
Grace, T.J., and K.S. Cain. 1991. Dissipation of triadimenol in California soils. Performing Laboratory Project IDs: ML022101, 89.020, 89.095, 892010.1-2, 89-0080. Submitting Laboratory Project ID: BT830089R01. Mobay Report No. 100151. Unpublished study performed by Plant Sciences, Inc., Watsonville, CA, Siemer and Associates, Inc., Fresno, CA, and Ricerca, Inc., Painesville, OH; and submitted by Mobay Corporation, Kansas City, MO.

STUDY ID 41686103
Carey, R.O. 1990. Subsurface soil investigation report, Mobay Corporation, Chualar River Road, Monterey County, CA. Mobay Project ID: ML022101. Mobay Report No. 100061. Unpublished study performed by Kleinfelder, Inc., Fresno, CA, and submitted by Mobay Corporation, Kansas City, MO.

DIRECT REVIEW TIME = 30

REVIEWED BY: J. Harlin
TITLE: Staff Scientist
ORG: Dynamac Corporation
TEL: 301-417-9800

APPROVED BY: J. Breithaupt | D. Edelstein
TITLE: Agronomist | Soil Scientist
ORG: EFGWB/EFED/OPP
TEL: 703-305-5925

D. Edelstein 4/11/94

SIGNATURE:

CONCLUSIONS:

This terrestrial field dissipation study was previously reviewed as an interim report (Study 3; MRID 41717501) in the Triadimefon Phase V Initial Draft Report, dated February 21, 1991. The registrant has submitted a final report to replace the interim report.

Dissipation - Terrestrial Field

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

2. Triadimenol dissipated with half-lives of 450 and 76.7 days in plots ranging in texture from sand to sandy loam soil located in Chualar and Fresno, California, respectively, that were planted to wheat and treated at 0.25 lb ai/A with a postemergent application of a 25% DF (dry flowable) formulation. Triadimenol residues were variable, with no discernible pattern, in similar plots that were treated with three applications of the DF at 0.25 lb ai/A/application (total 0.75 lb ai/A) applied at 7-day intervals. The degradate chlorophenoxymethyltriazole (CPMT) was not detected in soil from the single or multiple application plots.

3. Although the study is scientifically sound, it is not acceptable at this time for the following reasons:

   Although the study reports half-lives for triadimenol in Fresno and Watsonville, the results of this study give no indication of the dissipation/degradation route of triadimenol. No degradates were identified to indicate in situ chemical breakdown of triadimenol, and no evidence was provided to indicate off-site movement. There is no explanation of the reported drop in triadimenol recovery over time as reported here.

   Although other studies reviewed in this package (aged column leaching, MRID 42356601, field dissipation, MRID 42242701) demonstrate that triadimenol is mobile, there are virtually no detections of triadimenol below the surface layer in this study. The registrant should identify the particular conditions in this study that prevented downward movement of triadimenol.

4. The field dissipation study reviewed here may be upgraded if the registrant can provide credible hypotheses for the dissipation of triadimenol observed in this study. Although triadimenol concentrations declined throughout the test period, no dissipation route was identified. Based on laboratory and field data, the only known dissipation route for triadimenol is leaching, but there was no evidence of leaching in this study. The results suggest that triadimenol does not leach under the study conditions; it is important to identify environmental factors and management practices that exacerbate or mitigate triadimenol leaching in other field situations, as well as to identify the dissipation route for triadimenol in this study.

METHODOLOGY:

Triadimenol (Baytan 25% DF, Mobay) was applied to field plots planted to wheat at test sites in Chualar and Fresno, California. Two plots were maintained at each site, one plot for a single application and the other plot for multiple applications of the test substance. At the Chualar site, wheat was planted in the single application plot on July 10, 1989, and in the multiple application plot on June 15, 1989. At the Fresno site, wheat was planted in the single and multiple application plots on April 26, 1989. The soil types varied at each of the test locations, and ranged from sand to sandy loam at the Chualar site and from loamy sand to sandy loam at the Fresno site; the soil characteristics for each test site are provided in Table 1. The plots were separated by 15-foot buffers to minimize the effects of overspraying and/or drift.

Single application plots

Triadimenol was applied as a postemergent application at 0.25 lb ai/A to individual plots at each location. The Chualar plot (0.165 acres) was treated on July 19, 1989, and the Fresno plot (0.105 acres) was treated on June 19, 1989. Each plot was divided into three sections, and then further divided into 96 (Chualar) or 60 (Fresno) subsections for soil sampling purposes.

Multiple application plots

Triadimenol was applied in three postemergent applications, at 0.25 lb ai/A/treatment (total of 0.75 lb ai/A), made at 7-day intervals. The Chualar plot (0.21 acres) was treated beginning July 19 until August 2, 1989, and the Fresno plot (0.25 acres) was treated beginning June 19 until July 5, 1989. Each plot was divided into three sections, and then subdivided into 120 (Chualar) or 140 (Fresno) subsections for sampling purposes.

Soil sampling and analyses at both test sites

At the single application plots, fifteen randomly selected 6-inch soil cores were collected per sampling interval (five cores per section). Soil cores were collected at 0, 3, 7, 14, 28, 59, 92, 181, 271, 359, 453, and 541 days posttreatment at the Chualar site, and at 0, 4, 7, 14, 28, 60, 90, 179, 225, and 270 days posttreatment at the Fresno site. In the multiple application plots, 6-inch soil cores were collected immediately after each treatment and 4-foot soil cores were collected at later sampling intervals. Soil cores were collected at 3, 7, 14, 28, 61, 91, 125, 180, 272, 363, 450, and 540 days following the third application at the Chualar site, and at 0, 3, 7, 14, 28, 62, 90, 183, 211, 271, 362, 450, and 573 days at the Fresno site. The 6-inch soil cores were taken by pushing a 1-inch diameter 6-inch deep liner into the ground. The 4-foot cores were taken using a hydraulic soil sampler. The soil samples were transported on dry ice to the "recoring" facility where the diameter of the samples was reduced to eliminate contamination from the soil sampling process. The cores were sectioned into 6-inch segments within 24 hours of sampling. Samples from the same section of the plot, soil depth, and sampling interval were composited. The soil samples that were analyzed for triadimenol were stored frozen for up to 403 days prior to extraction, with >90% of the soil samples extracted within 168 days. Soil samples that were reanalyzed for the degradate, chlorophenoxymethyltriazole (CPMT) were stored frozen for 363 days prior to extraction.

The soil samples were analyzed for triadimenol using Mobay Method No. 51231. The samples were extracted by refluxing with methanol:water (70:30), then filtered. The extract was partitioned with chloroform, and the chloroform fraction was chromatographed on a Florisil column eluted with hexane:ethyl acetate (60:40). The eluate was evaporated to dryness under a nitrogen stream and the residues were redissolved in acetone and analyzed by GC with nitrogen/phosphorus detection. Soil samples were reanalyzed for CPMT using the same method, except that the extracts were partitioned with methylene chloride and the Florisil column was eluted with ethyl acetate. Recoveries for soil samples from each study site that were fortified with triadimenol at 0.01-0.5 ppm were 60-110%. Recoveries for soil samples from each study site that were fortified with CPMT at 0.01 ppm were 100-110%. Additional soil samples were fortified at 0.10 ppm with triadimenol or CPMT and analyzed concurrently with the field samples; recoveries were 70-130% for triadimenol and 72-110% for CPMT. The detection limit for triadimenol and CPMT was 0.01 ppm.

DATA SUMMARY:

Single application plots

Triadimenol dissipated with registrant-calculated half-lives of 450 and 76.7 days in plots (0.105-0.165 acres) located in Chualar and Fresno, California, respectively, that were planted to wheat and treated with a single postemergent application of triadimenol (25% dry flowable) at 0.25 lb ai/A in June or July 1989. The soil ranged in texture from sand to sandy loam at the Chualar site and from loamy sand to sandy loam at the Fresno site.

In the upper 6 inches of soil at the Chualar plot, triadimenol was present at concentrations of 0.06-0.19 ppm immediately posttreatment, increased to 0.11-0.29 ppm at 3 days, decreased to 0.02-0.09 ppm at 7-181 days, and was 0.02-0.06 ppm at 271-541 days posttreatment (Tables 10-20). Triadimenol was not detected (<0.01 ppm) below the 6-inch depth except for two soil samples from the 6- to 12-inch depth that contained 0.01 and 0.11 ppm at 3 days posttreatment. The degradate

chlorophenoxymethyltriazole (CPMT)

was not detected (<0.01 ppm) in any soil samples (Tables 10-20). During the study, air temperatures at the Chualar site ranged from approximately -5 to 35 °C. Soil temperatures (3-inch depth) ranged from 6 to 22 °C. Cumulative irrigation plus rainfall totaled 67.50 inches by 541 days posttreatment.

In the upper 6 inches of soil at the Fresno plot, triadimenol was present at 0.01-0.12 ppm immediately posttreatment, 0.03-0.08 ppm at 4-60 days, and was ≤0.01 (not detected)-0.03 ppm at 91-270 days posttreatment (Tables 21-30). Triadimenol was not detected below the

6-inch depth, except was 0.01 ppm in the 6- to 12-inch depth at 225 days. The degradate CPMT was not detected (<0.01 ppm) in any soil samples. Air temperatures at the Fresno site ranged from approximately -5 to 39 °C during the study period. Soil temperatures (3-inch depth) ranged from approximately 4 to 35 °C. Cumulative irrigation plus rainfall totaled 20.38 inches by 270 days posttreatment.

Multiple application plots

Triadimenol residues were variable, with no discernible pattern, in plots (0.21-0.25 acres) located in Chualar and Fresno, California, that were planted to wheat and treated with three postemergent applications of triadimenol (25% dry flowable), at 0.25 lb ai/A/treatment (total 0.75 lb ai/A), applied at 7-day intervals beginning June or July 1989.

In the upper 6 inches of soil (sand to sandy loam) at the Chualar site, triadimenol concentrations immediately following each treatment were 0.12-0.18 ppm following the first, 0.19-0.32 ppm following the second, and 0.02-0.35 ppm following the third application (Tables 31-42). Following the third application, triadimenol in the 0- to 6-inch depth was 0.07-0.25 ppm at 3-124 days, 0.11-0.31 ppm at 272 days, 0.08-0.15 ppm at 363 days, 0.15-0.22 ppm at 450 days, and 0.06-0.19 ppm at 540 days posttreatment. Triadimenol was present at maximum concentrations of 0.08 ppm in the 6-to 12-inch depth at 124 and 450 days and 0.02 ppm in the 12- to 18-inch depth at 272 days posttreatment, and was <0.01 ppm (not detected) below 18 inches. The degradate CPMT was not detected (<0.01 ppm) in any soil samples. During the study, air temperatures at the Chualar site ranged from approximately -5 to 35 °C. Soil temperatures (3-inch depth) ranged from approximately 7 to 22 °C. Cumulative irrigation plus rainfall totaled 69.80 inches by 540 days posttreatment.

In the upper 6 inches of soil (loamy sand to sandy loam) at the Fresno site, triadimenol concentrations immediately following each treatment were 0.04-0.06 ppm following the first, 0.06-0.11 ppm following the second, and 0.08-0.27 ppm following the third application (Tables 43-54). Following the third application, triadimenol in the 0- to 6-inch depth was 0.06-0.19 ppm at 3-90 days, 0.02-0.09 ppm at 183-362 days, and ≤0.03 ppm at 450-573 days posttreatment. Triadimenol was a maximum of 0.02 ppm in the 6- to 12-inch depth at 3 and 62 days posttreatment, and was <0.01 ppm (not detected) below 12 inches. The degradate CPMT was not detected (<0.01 ppm) in any soil samples. Air temperatures at the Fresno site ranged from approximately -8 to 42.5 °C during the study period. Soil temperatures (3-inch depth) ranged from approximately 2 to 35 °C. Cumulative irrigation plus rainfall totaled 28.94 inches by 573 days posttreatment.

COMMENTS:

1. The analytical method was referenced (Mobay Report No. 51231) and briefly summarized, but the reference was not provided for review. A complete description of the analytical method should be provided by the registrant. The study authors reported several modifications to the method to analyze for CPMT, such as the use of methylene chloride instead of chloroform for the partitioning step in the analysis protocol, but it is unclear if chloroform was actually used for the analysis of triadimenol. The study authors also reported that toluene was used in place of benzene, but it was not reported when these solvents were used in the extraction procedure.

2. It appears that the plots in this study were maintained in a relatively dry condition, appropriate to the cultivation of wheat. A total of 65.05 inches of rain plus irrigation were applied over 540 days in Chualar, while 28.44 inches were applied over 540 days in Fresno. Monthly evapotranspiration in both sites is over 40 inches per month.

3. The freezer storage stability study for triadimenol was referenced (Mobay Report No. 52725), but the reference was not provided for review. However, the data from the referenced study are included in Appendix 4 of the document. Based on these data, triadimenol is stable in loam soil stored frozen at 0 to -10 F for up to 516 days; $\leq$4% of the test substance had degraded at any sampling interval (Table 56). The field soil samples were stored frozen for up to 403 days; >90% of the samples were extracted within 168 days from sampling, and none of the remaining approximately 10% of the samples contained measurable residues.

   The soil samples that were analyzed for CPMT were stored frozen for up to 363 days prior to extraction because CPMT was not identified as a degradate of interest until the completion of the study. The soil samples were stored frozen as follows: 31% were stored for 0-100 days; 10% for 101-200 days; 18% for 201-300 days; and 41% for 301-363 days. Based on the results of a freezer storage stability study, CPMT was stable in soil samples stored frozen at <10 °F for up to 367 days.

4. The characterizations of the test sites were incomplete; the slope of the field was not provided for the Fresno site, and the depth to the water table was not provided for either site. The slope of the test plots at the Chualar site was $\leq$0.05%.

5. There were no control plots at either study site. However, pretreatment soil samples collected at the test sites did not contain detectable residues, thereby confirming that the sites were not contaminated prior to the initiation of the study.

6. Meteorological data for the Chualar site were obtained at the site except when a weather station malfunction occurred, at which time the data were obtained from a California Irrigation Management Information System (CIMIS) weather station located 4 miles from the

study site. Data were obtained from the CIMIS station on August 17-September 30, 1989 and November 21-December 8, 1989. Soil temperature data obtained for the Chualar site from the CIMIS station were daily averages, rather than daily minimum and maximum temperatures. Meteorological data provided for the Fresno site were measured at the site from July 5, 1989 until the end of the study. Supplemental weather data obtained prior to 7/5/89, and on 7/19-25, 11/13-19, and 12/31/89; and on 2/14, 2/22, 4/9 and 4/15/90 were extrapolated for the test site using data obtained from a CIMIS station located 10 miles from the study site. It is preferred that meteorological data be measured at the test site, since rainfall and temperature differences can vary between sites in close proximity.

7. Descriptions of the agricultural maintenance procedures employed during 1989-91 for both the single and multiple application plots are provided in Tables 3 and 4. At the Chualar site, broccoli was planted two years prior to the initiation of the study. At the Fresno site, squash was planted in 1989 prior to the study initiation; no crops were planted during 1987-88. The Fresno site was planted to wheat on April 26, 1989; due to areas of poor stand development, the plots were replanted on May 24, 1989.

8. It was reported that the single application rate of 0.25 lb ai/A is the maximum registered use rate, and the multiple application rate of 0.25 lb ai/A/application in three treatments (total 0.75 lb ai/A) is 1.5 times the maximum seasonal application rate listed on the proposed label for the test substance.

9. The pesticide histories for each of the test sites during the three years prior to each experiment are provided in Table 1.

10. The study authors stated that the recoring process may have compacted the soil cores. Each soil core was sectioned into six equal segments of 6 inches or less; the final segment length depended on whether compaction occurred.

Page ______ is not included in this copy.

Pages 21 through 80 are not included in this copy.

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.

REFERENCES

The following studies were reviewed:

Carey, R.O. 1990. Subsurface soil investigation report, Mobay Corporation, Chualar River Road, Monterey County, CA. Mobay Project ID: ML022101. Mobay Report No. 100061. Unpublished study performed by Kleinfelder, Inc., Fresno, CA, and submitted by Mobay Corporation, Kansas City, MO. (41686103)

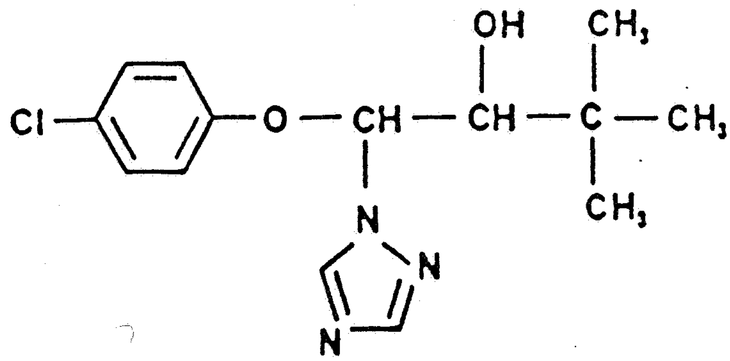
Grace, T.J., and K.S. Cain. 1991. Dissipation of triadimenol in California soils. Performing Laboratory Project IDs: ML022101, 89.020, 89.095, 892010.1-2, 89-0080. Submitting Laboratory Project ID: BT830089R01. Mobay Report No. 100151. Unpublished study performed by Plant Sciences, Inc., Watsonville, CA, Siemer and Associates, Inc., Fresno, CA, and Ricerca, Inc., Painesville, OH; and submitted by Mobay Corporation, Kansas City, MO. (42403301)

The following study was not reviewed because it was previously reviewed by Dynamac in a Phase V, Task 1 Report submitted on February 21, 1991:

Grace, T.J., and K.S. Cain. 1990. Dissipation of triadimenol in California soils. Performing Laboratory Project IDs: ML022101, 89.020, 89.095, 892010.1-2, 89-0080. Submitting Laboratory Project ID: BT830089R01. Mobay Report No. 100151. Unpublished study performed by Plant Sciences, Inc., Watsonville, CA, Siemer and Associates, Inc., Fresno, CA, and Ricerca, Inc., Painesville, OH; and submitted by Mobay Corporation, Kansas City, MO. (41717501)

APPENDIX

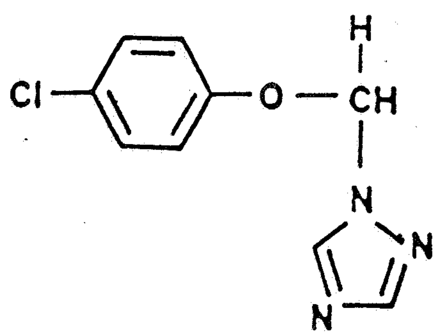
TRIADIMENOL AND ITS DEGRADATE



1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanol

beta-(4-Chlorophenoxy)-alpha-(1,1-dimethyl-ethyl)-1H-1,2,4-triazole-1-ethanol

(Triadimenol)



4-Chlorophenoxy-1,2,4-triazol-1-yl-methane

(Chlorophenoxymethyltriazole; CPMT)

83