

Data Evaluation Report on the terrestrial field dissipation of prothioconazole

PMRA Submission Number N/A

EPA MRID Number 46246517

Data Requirement: PMRA Data Code: 8.3.2
EPA DP Barcode: D303488
OECD Data Point:
EPA Guideline: 164-1

Test material: JAU6476

End Use Product name: JAU6476 250 SC
Formulation type: Soluble concentrate

Concentration of a.i.: 252 g a.i./L

Active ingredient

Common name: Prothioconazole.

Chemical name:

IUPAC: (RS)-2-[2-(1-Chlorocyclopropyl)-3-(2-chlorophenyl)-2-hydroxypropyl]-2,4-dihydro-3H-1,2,4-triazole-3-thione.

CAS name: 2-[2-(1-Chlorocyclopropyl)-3-(2-chlorophenyl)-2-hydroxypropyl]-1,2-dihydro-3H-1,2,4-triazole-3-thione.

CAS No: 178928-70-6.

Synonyms: JAU6476.

SMILES string: C1C(C(Cc2ccccc2Cl)(CN2N=CNC2=S)O)CC1.

Primary Reviewer: Dan Hunt
Dynamac Corporation

Signature:

Date:

QC Reviewer: Joan Harlin
Dynamac Corporation

Signature:

Date:

Secondary Reviewer: Roxolana Kashuba
EPA/OPP/EFED/ERB4

Signature:

Date: July 14, 2005

Company Code:

Active Code:

Use Site Category:

EPA PC Code: 113961

CITATION: Wood, S.E. 2004. Terrestrial field dissipation of JAU6476 in California soil, 1999. Unpublished study performed by A & L Great Lakes Laboratories, Inc., Fort Wayne, IN, Bayer CropScience, Stilwell, KS and Bayer CropScience, Fresno, CA and submitted by Bayer CropScience, Research Triangle Park, NC. Submitting Laboratory Study No. J6022102. Bayer Report No. 200051. Experiment initiation May, 1999, and completion December, 2000 (field phase; p. 12). Final report issued January 29, 2004.

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Dynamac Corporation

Signature: *Dan Hunt*
Date: 10-27-2004

QC Reviewer: Joan Harlin
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Date: 10/27/04

Secondary Reviewer: John Ravenscroft
EPA

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Date:

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EXECUTIVE SUMMARY:

Soil dissipation/accumulation of prothioconazole ((RS)-2-[2-(1-chlorocyclopropyl)-3-(2-chlorophenyl)-2-hydroxypropyl]-2,4-dihydro-3H-1,2,4-triazole-3-thione; JAU6476) under US field conditions was conducted in a bare plot of sandy loam soil near Fresno, California (ecoregion not reported). The experiment was carried out in accordance with USEPA Subdivision N Guideline §164-1 and in compliance with the USEPA GLP standards. Prothioconazole was sprayed six times (at 14-day intervals) at a target application rate of 0.336 kg a.i./ha/application (4.8 oz. a.i./A/application; 2.017 kg a.i./ha/season) in a test plot measuring 24 x 37 m (120 x 80 ft.). The test substance was applied at 110% of the proposed label rate. Rainfall was supplemented with irrigation to reach a cumulative amount of 93.24 inches during the study period, which is 101.9% of the reference evapotranspiration for grass (historical rainfall was not reported). A control plot was located approximately 56 m away from the treated plot.

The application rate was verified for each application using solvent saturation pads (13.7 x 22 cm) and soil pans (86.25 in²) that were placed in all five sections of the treated plot. Mean recoveries of prothioconazole from the soil pads were 82.8%, 86.2%, 82.4%, 93.6%, 73.0%, 96.0% of the applied amount (4.8 oz. a.i./A) (91.2%, 94.9%, 90.7%, 103.1%, 80.4%, and 105.7% of the label rate (4.36 oz. a.i./A)) for the first through sixth applications, respectively. Corresponding recoveries from the soil pans were 82.8%, 88.0%, 87.0%, 81.9%, 83.7%, and 91.1% of the applied amount (91.2%, 96.9%, 95.8%, 90.2%, 92.2%, and 100.2% of the label rate) for the first through sixth applications, respectively. Field spikes were prepared for the transformation products JAU6476-desthio, JAU6476-S-methyl, and 1,2,4-triazole in duplicate at 50 µg/kg. Recoveries from field spikes were 84-85% for JAU6476-desthio, 84-87% for JAU6476-S-methyl, and 73% for 1,2,4-triazole following 1211 days of storage. Field spikes were not prepared for prothioconazole and the transformation product JAU6476 thiazocine.

Soil samples were taken immediately following each of the six applications (at -70, -56, -42, -28, -14, 0 days, respectively) and at 3, 7, 14, 29, 63, 122, 239, 307, 427, and 553 days after the sixth application to a depth of 0-120 cm (except application 1, day 0 (at -71 days) samples, which were collected to a depth of 15 cm). Soil samples were extracted with acetonitrile:water:cysteine hydrochloride (800:200:0.5, v:v:w) and analyzed for prothioconazole and the transformation products **JAU6476-desthio** (2-[2-(1-chlorocyclopropyl)-3-(2-chlorophenyl)-2-hydroxypropyl]-1,2-dihydro-3H-1,2,4-triazole), **JAU6476-S-methyl** (alpha-1(1-chlorocyclopropyl)-alpha-[(2-chlorophenyl)methyl]-3-(methylthio)-1H-1,2,4-triazole-1-ethanol), and **JAU6476 thiazocine** (6-(1-chlorocyclopropyl)-6,7-dihydro-triazole-5H-[1,2,4]triazolo[5,1-b][1,3]benzothiazon-6-ol) by LC/MS/MS. Separate soil samples were extracted by sonicating with acetonitrile:water (6:4, v:v) and were analyzed for **1,2,4-triazole** (1-H-1,2,4-triazole) by LC/MS/MS detection following derivatization to dansyl 1,2,4-triazole. Soil samples were stored for up to 1092 days for the analysis of prothioconazole, JAU6476-desthio, JAU6476-S-methyl, and JAU6476 thiazocine and up to 746 days for the analysis of 1,2,4-triazole. The LOQ was 10 µg/kg for all compounds in soil. The MDLs were 2.0, 2.0, 1.2, 1.7, and 0.9 µg/kg for prothioconazole, -desthio, -S-methyl, -thiazocine, and 1,2,4-triazole, respectively.

The mean concentration of prothioconazole in the 0-15 cm soil depth following the first application (at -71 days) was 23.7 µg/kg, which is 18.2 % of the theoretical applied

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concentration, 130.0 µg/kg (20.1% of the theoretical concentration if applied at label rate, 118 µg/kg). Mean concentrations of prothioconazole in the 0-15 cm soil depth following the second through fifth applications were 14.0 µg/kg, 22.5 µg/kg, 22.2 µg/kg, and 25.4 µg/kg, respectively. Following the sixth application, prothioconazole was detected in the 0-15 cm soil depth at a mean maximum concentration of 33.1 µg/kg at day 0, and decreased to <LOQ by 3 days posttreatment. Prothioconazole was not detected below the 0-15 cm soil depth. One major (>10% of applied) transformation product, JAU6476-desthio, was initially detected in the 0-15 cm soil depth at a mean concentration of 25.3 µg/kg (21.5% of applied parent based on one application, after converting to parent equivalents) immediately following the first application, increased to a maximum mean concentration of 191.0 µg/kg (27.0% of applied parent based on six applications, after converting to parent equivalents) by 3 days post sixth application, then decreased to a mean concentration of 78.6 µg/kg (11.1% of applied parent) by 63 days posttreatment and was last detected above the LOQ at a mean of 12.3 µg/kg at 307 days posttreatment. JAU6476-desthio was not detected at a mean concentration above the LOQ (10 µg/kg) below the 0-15 cm soil depth, but was detected at 19.7, 16.3, and 10.2 µg/kg in individual replicates in the 15-30 cm soil depth at 63, 7, and 7 days post treatment, respectively. Two minor transformation products, JAU6476-S-methyl and 1,2,4-triazole, were detected above the MDL in the 0-15 cm and 0-45 cm soil depths, respectively. JAU6476-S-methyl was detected in the 0-15 cm soil depth at a maximum mean concentration of 14.2 µg/kg (1.7% of applied parent) by 3 days post sixth application, then was last detected above the LOQ (10 µg/kg) at a mean of 10.5 µg/kg (1.3% of applied parent) at 7 days posttreatment, and was last detected above the MDL (1.2 µg/kg) at a mean of 1.9 µg/kg (0.2% of applied parent) at 63 days post sixth application. In the 15-30 cm soil depth, JAU6476-S-methyl was detected above the MDL at 1.6 µg/kg (0.2% of applied parent) in a single replicate at 7 days posttreatment, and was not detected above the MDL in any other sample below the 0-15 cm soil depth. 1,2,4-triazole was not detected above the LOQ at any sampling interval at any soil depth, but, in the 0-45 cm soil depth, was detected above the MDL in a range from 0.9-7.3 µg/kg (0.6-4.7 % of applied parent) in single replicates. JAU6576-thiazocine was not detected above the MDL in any sampling interval at any depth.

Under field conditions at the test site, prothioconazole had an observed DT50 value of <3 days. The half-life calculated using linear regression on log-transformed data is 2.2 days ($r^2 = 0.7642$). The observed DT90 occurred at 7 days. At the end of the study period, 553 days after the sixth application, the total carryover of the parent and transformation products was 0% and 0.9% of the total applied prothioconazole (based on six applications), respectively.

The JAU6476-desthio half-life, calculated using linear regression on log-transformed data, is 84.5 days. The observed DT50 and DT90 values for JAU6476-desthio are 63 days and between 239-307 days, respectively. The JAU6476-S-methyl half-life, calculated using linear regression on log-transformed data, is 21.2 days. The observed DT50 and DT90 values for JAU6476-S-methyl are between 14-29 days and between 239 and 63 days, respectively.

The major route of dissipation of prothioconazole under terrestrial field conditions at the test site was transformation.

RESULTS SYNOPSIS

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Location/soil type: Fresno, California/Sandy loam-loam (0-180 cm) soil.

Prothioconazole half-life ($t_{1/2}$, calculated): 2.2 days.

Prothioconazole half-life (DT50, observed): <3 days.

Prothioconazole DT90 (observed): 7 days.

Major transformation products detected: JAU6476-desthio

Minor transformation products detected: JAU6476-S-methyl and 1,2,4-triazole.

Dissipation routes: Transformation.

JAU6476-desthio half-life ($t_{1/2}$, calculated): 84.5 days.

JAU6476-desthio half-life (DT50, observed): 63 days.

JAU6476-desthio DT90 (observed): 239-307 days.

JAU6476-S-methyl half-life ($t_{1/2}$, calculated): 21.2 days.

JAU6476-S-methyl half-life (DT50, observed): 14-29 days.

JAU6476-S-methyl DT90 (observed): 63 days.

Study Acceptability: This study is classified supplemental and does not satisfy the guideline requirement for a terrestrial field dissipation study because prothioconazole was not stable in frozen storage.

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED:

The study was conducted according to USEPA Pesticide Assessment Guidelines Subdivision N, 164-1 (p. 1). There was one deviation from EPA Subdivision N, 164-1, and it did not affect the validity of the study.

The laboratory storage stability study was inadequate to demonstrate stability of any of the analytes during storage because samples were not analyzed at time 0 to determine initial recoveries, and sampling intervals were inadequate to determine stability of the analytes over time.

COMPLIANCE:

The study was conducted in compliance with USEPA FIFRA (40 CFR Part 160) Good Laboratory Practice standards (p. 3). Signed and dated GLP Compliance, Quality Assurance, Data Confidentiality and Certification of Authenticity statements were provided (pp. 2-5).

A. MATERIALS:

1. Test Material

Prothioconazole (JAU6476; p. 11).

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Chemical Structure

of the active ingredient(s): See DER Attachment 1.

Description:

Clear to slightly beige solid (Table 1, p. 29).

Storage conditions of test chemicals:

Ambient (p. 13).

Physico-chemical properties of the active ingredient(s): Prothioconazole

Parameter	Values	Comments
Chemical Formula	C ₁₄ H ₁₅ Cl ₂ N ₃ OS	
Molecular weight	344.27	
Water solubility	pH 4 = 5 mg/L; pH 8 = 300 mg/L; pH 9 = 2000 mg/L	
Vapour pressure/volatility	Not reported	
UV absorption	Not reported	
pKa	Not reported	
K _{ow} /log K _{ow}	Unbuffered: Kow = 11300; Log Kow = 4.05 pH 4: Kow = 14600; Log Kow = 4.16 pH 7: Kow = 6600; Log Kow = 3.82 pH 9: Kow = 100; Log Kow = 2.00	
Stability of Compound at room temperature	Not reported	

Data were obtained from Table 1, p. 29 of the study report.

2. Test site: The test site was located near Fresno, California, in a region representative of turf and vegetable production in the United States (p. 12; Figures 2-3, pp. 52-53). The soil at the test site was classified as a Hesperia fine sandy loam and consisted of predominantly sandy loam (0-75 cm and 90-180 cm) soil (Table 2, p. 30). The only product applied to the plot in the previous five years was imidacloprid.

Table 1: Geographic location, site description and climatic data at the study site.

Details		Test site
Geographic coordinates	Latitude	N 36.50.07'
	Longitude	W 119.56.04'
	Province/State	California
	Country	US
	Ecoregion	Not reported

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Details	Test site
Slope Gradient	<1%
Depth to ground water (m)	>3 m
Distance from weather station used for climatic measurements	Rainfall and irrigation data were collected on-site. All other weather data were collected from the California Irrigation Management System station in Fresno, approximately 10 miles from the test site.
Indicate whether the meteorological conditions before starting or during the study were within 30 year normal levels (Yes/No). If no, provide details.	Could not be determined because historical precipitation data were not reported. Total water input (precipitation plus irrigation) during the study period was approximately equal to the reference evapotranspiration for grass.

Data were obtained from pp. 12-13, 15 and 24, and Table 4, p. 32 of the study report.

Table 2: Site usage and management history for the previous three years.

Use	Year	Test site
Crops grown	Previous year	Not reported
	2 years previous	Not reported
	3 years previous	Not reported
Pesticides used	Previous year	None
	2 years previous	None
	3 years previous	None
Fertilizers used	Previous year	Not reported
	2 years previous	Not reported
	3 years previous	Not reported
Cultivation methods, if provided (eg., tillage)	Previous year	Not reported
	2 years previous	Not reported
	3 years previous	Not reported

Data were obtained from p. 12 of the study report.

3. Soils:

Table 3: Properties of the soil from the test site (Hesperia soil series).

Property	Depth (cm)									
	0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120	120-150	150-180
Textural classification	SL	SL	SL	SL	SL	L	SL	SL	SL	SL

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Property	Depth (cm)									
	0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120	120-150	150-180
% sand	60.8	60.8	64.8	60.8	56.8	50.8	52.8	52.8	62.8	60.8
% silt	31.6	29.6	27.6	31.6	35.6	41.6	41.6	41.6	31.6	35.6
% clay	7.6	9.6	7.6	7.6	7.6	7.6	5.6	5.6	5.6	3.6
pH	8.2	7.9	7.9	7.8	7.7	7.5	7.6	7.5	7.6	7.5
Total organic matter (%)	0.38	0.27	0.22	0.33	0.27	0.43	0.27	0.27	0.16	0.16
CEC (meq/100 g)	4.65	4.60	4.22	4.45	4.72	4.31	3.97	3.82	3.23	3.19
Bulk density (g/cm ³)	1.70	1.67	1.64	1.74	1.69	1.65	1.71	1.73	1.83	1.87
Moisture at 1/3 atm (%)	9.21	8.76	8.59	9.38	9.74	9.32	9.33	8.28	7.27	6.32
Taxonomic classification (e.g., ferro-humic podzol)	Coarse-loamy, mixed, non-acid, thermic Xeric Torriorthents									
Soil mapping unit	Not reported									

Data were obtained from Table 2, p. 30 of the study report. SL = Sandy loam, L = Loam.

B. EXPERIMENTAL DESIGN:

1. Experimental design:

Table 4: Experimental design.

Details		Test site
Duration of study		623 days (553 days following the last application)
Uncropped (bare) or cropped		Bare
Control used (Yes/No)		Yes
No. of replications	Controls	One
	Treatments	One
Plot size (L x W m)	Control	Not reported
	Treatment	24.3 x 36.5 m, divided into five equal sections for sampling.
Distance between control plot and treated plot		56.3 m
Distance between treated plots		Not reported
Application rate(s) used (g a.i./ha)		336 g a.i./ha/application (4.8 ounces a.i./A/application)

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Details		Test site						
Was the maximum label rate per ha used in study? (Yes/No)		The application rate was 110% of a 4.32 ounces a.i./A proposed label rate. The 480SC label has a maximum proposed label rate of 2.85 ounces a.i./A.						
Number of applications		Six						
Application Date(s) (dd mm yyyy)	Application 1	25/05/1999						
	Application 2	08/06/1999						
	Application 3	22/06/1999						
	Application 4	06/07/1999						
	Application 5	20/07/1999						
	Application 6	03/08/1999						
For multiple applications, application rate at Day 0 and at each application time (mg a.i./kg soil) ¹		0.130 mg a.i./kg						
Application method (eg., spraying, broadcast etc.)		Broadcast spray						
Type of spray equipment, if used		A custom built sprayer with a hydraulic pump was equipped with 12 T-Jet 8003 flat fan nozzles (spaced 20 inches apart and set 18 inches above the ground).						
Total volume of spray solution applied/plot OR total amount broadcasted/plot		Approximately 30 gal/A for each application.						
Identification and volume of carrier (e.g., water), if used		Water						
Name and concentration of co-solvents, adjuvants and/or surfactants, if used		None						
Indicate whether the following monthly reports were submitted: Precipitation Average minimum and maximum air temperature Average minimum and maximum soil temperature Average annual frost-free periods		Yes Yes No, mean only (a 2-inch depth) No (number of frost days per month was reported)						
Indicate whether the Pan evaporation data were submitted		No, evapotranspiration data were reported.						
Meteorological conditions during application	Application	1	2	3	4	5	6	
	Cloud cover	Clear	Clear	Clear	---	Clear	Clear	
	Temperature (°C)	23.3	15.6	26.1	---	29.4	23.3	
	Humidity	---	---	---	---	---	---	
	Wind speed (mph) and	2-4,	4-6,	0-2,	2-5,	0-5,	3-6,	

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Details		Test site					
	direction	NW	NW	NW	NW	NW	NW
	Sunlight (hr)	Not reported					
Pesticides used during study:							
name of product/a.i concentration:		Roundup					
amount applied:		Two applications at 1 qt/A					
application method:		Not reported					
name of product/a.i concentration:		Gramoxone					
amount applied:		Two applications at 1 pt/A					
application method:		Not reported					
Supplemental irrigation used (Yes/No)		Yes					
If yes, provide the following details:							
No. of irrigation:		172					
Interval between irrigation:		1-65 days					
Amount of water added each time:		0.01-1.49 inches					
Method of irrigation:		Overhead sprinkler					
Indicate whether water received through rainfall + irrigation equals the 30 year average rainfall (Yes/No)		Historic rainfall data were not reported. Total water input during the study period exceeded cumulative evapotranspiration for grass for the same interval.					
Were the application concentrations verified? (Briefly describe in Section 2 [*] , if used)		Yes					
Were field spikes used? (Briefly describe in Section 3 [†] , if used)		Yes					
Good agricultural practices followed (Yes or No)		Not reported					
Indicate if any abnormal climatic events occurred during the study (eg., drought, heavy rainfall, flooding, storm etc.)		None					
If cropped plots are used, provide the following details:		N/A					
Plant - Common name/variety:							
Details of planting:							
Crop maintenance (eg., fertilizers used):							
Volatilization included in the study (Yes/No) (if included, describe in Section 4 [§])		No					
Leaching included in the study (Yes/No) (if included, describe in Section 5 ⁱ)		Yes					
Run off included in the study (Yes/No) (if included, describe in Section 6 ^y)		No					

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Data were obtained from pp. 12-15, Tables 3-5, pp. 31-33, Figure 4, p. 54 and Appendix 2, pp. 81-97 of the study report.

The treated plot was rototilled and rolled prior to the first application (p. 13).

¹ The application rate at day 0, reported as mg a.i./kg soil, is calculated based on the site-specific bulk density of the 0-15 cm soil depth (1.70 g/cm³) and the application rate of 336 g a.i./ha (4.8 oz a.i./A; pp. 25-26).

2. Application Verification: The application rate was verified for each application using solvent saturation pads and soil pans (p. 14). Two solvent saturation pads (13.7 x 22 cm) were placed in each of the five sections of the test plot immediately prior to each application (10 pads total for each application). Following each application, the two pads from each section of the plot were collected and placed together in a plastic bag (one bag for each section). The pads were extracted three times by shaking for 30 minutes, once with 100 mL of 0.01% L-cysteine hydrochloride and 100 mL of acetonitrile, and twice with 160 mL of acetonitrile:water (1:1, v:v; pp. 16-17 and Appendix 3, pp. 98-100). The extracts were combined and brought to volume with acetonitrile:water (1:1, v:v), and an aliquot was filtered (0.45 µm Acrodisc filter) and analyzed for prothioconazole and JAU6476-desthio by HPLC-UV (Phenomenex Luna C-18(2) column, 150 mm x 2.0 mm, 5-µm; mobile phase of 0.1% phosphoric acid:acetonitrile, 55:45, v:v).

Metal pans (86.25 in²) containing approximately 500 g of sieved (2 mm) soil from the control plot were also placed in each section of the test plot prior to each application (5 pans total for each application; p. 14). Soil from each pan was collected and poured into a plastic bag after each application. Samples of soil (12.5 g) from the soil pans were extracted three times by shaking with extraction solvent for one hour (pp. 17-18; Appendix 4, pp. 103-106). Extraction solvent was prepared by dissolving 1.0 g L-cysteine hydrochloride and 10 g guanidine hydrochloride in 1 L water and mixing 1:1 (v:v) with acetonitrile. The extracts were combined, then brought to volume with extraction solvent, and an aliquot was filtered (0.45 µm Acrodisc filter) and analyzed for prothioconazole and JAU6476-desthio by HPLC-UV (Phenomenex Luna C-18(2) column, 250 mm x 2.0 mm, 5-µm; mobile phase of 0.1% phosphoric acid:acetonitrile, 55:45, v:v).

3. Field Spiking: Field spikes were prepared in duplicate at selected sampling intervals for JAU6476-desthio, JAU6476-S-methyl, and 1,2,4-triazole (p. 15; Table 14, p. 47). Soil samples were fortified with each analyte at 50 µg/kg, frozen, and taken to the field during sampling. The field spikes were kept under the same conditions as the field cores until analysis. Field spikes were analyzed following 1211 days of storage, which exceeded the longest storage interval for the field samples. Field spikes were not prepared for prothioconazole and JAU6476 thiazocine.

4. Volatilization: Volatilization was not measured.

5. Leaching: Fifteen cores were taken from the treated plot immediately following each of the six applications and at 3, 7, 14, 29, 31, 63, 122, 239, 307, 427, and 553 days after the sixth application to a depth of 120 cm (except application 1, day 0 (day -70) samples which were collected to a depth of 15 cm) to determine the mobility of the test substance in the soil profile (pp. 14-15; Table 3, p. 31). The first irrigation/rainfall event, 0.36 inches, occurred on the day following the first application (Appendix 2, p. 81). Total water input through the first full month

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of the study was 7.75 inches, compared to a cumulative evapotranspiration of 9.7 inches (Table 4, p. 32).

6. Run off: Run off was not studied.

7. Supplementary Study: To determine the frozen storage stability of the transformation products JAU6476-desthio, JAU6476-S-methyl, JAU6476 thiazocine, and 1,2,4-triazole in soil, samples were fortified with JAU6476-desthio, JAU6476-S-methyl, and 1,2,4-triazole at 50 µg/kg and with JAU6476 thiazocine at 100 µg/kg (p. 23; Table 14, p. 47). Samples were analyzed for JAU6476 thiazocine following 644 and 883 days of storage, and samples were analyzed for JAU6476-desthio, JAU6476-S-methyl, and 1,2,4-triazole following 802-804 days of storage. Samples were not analyzed at day 0 to determine initial recoveries.

Additionally, a method validation study was conducted with control soil from the test site that was fortified with prothioconazole, JAU6476-desthio, JAU6476-S-methyl, JAU6476 thiazocine, and 1,2,4-triazole at 10 µg/kg (seven replicates) and 100 µg/kg (five replicates; p. 21-22).

Also, soil samples were fortified with prothioconazole, JAU6476-desthio, JAU6476-S-methyl, JAU6476 thiazocine, and 1,2,4-triazole at 50 µg/kg and analyzed concurrently with the test samples (p. 25).

8. Sampling:

Table 5: Soil sampling.

Details	Test site
Method of sampling (random or systematic)	Random
Sampling intervals	Immediately following each of the six applications and at 3, 7, 14, 29, 31, 63, 122, 239, 307, 427, and 553 days after the sixth application.
Method of soil collection (eg., cores)	Cores
Sampling depth	120 cm, with the exception of samples collected immediately following the first application, which were collected to a depth of 15 cm.
Number of cores collected per plot	15 (three from each sampling section)
Number of segments per core	Eight
Length of soil segments	15 cm
Core diameter (Provide details if more than one width)	5.72 cm (2.25 inches) for the 0- to 15-cm depth cores and 4.45 cm (1.75 inches) for the 15- to 120-cm depth cores.
Method of sample processing, if any	Following sectioning of the soil cores, three sample composites were prepared for each sampling interval and depth by combining one core from each section of the plot. Composite samples were homogenized by mixing with dry ice, and then run through a hammermill equipped with a

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Details	Test site
	2-mm sieve. The milled soil was mixed in a bucket mixer and transferred to a freezer for dry ice sublimation.
Storage conditions	Frozen
Storage length (days)	Up to 1092 days for prothioconazole, JAU6476-desthio, JAU6476-S-methyl, and JAU6476 thiazocine. Up to 746 days for 1,2,4-triazole.

Data were obtained from pp. 14-16; Table 3, p. 31; and Tables 8-12, pp. 36-45 of the study report.

9. Analytical Procedures: Soil samples were analyzed for prothioconazole and the transformation products JAU6476-desthio (2-[2-(1-chlorocyclopropyl)-3-(2-chlorophenyl)-2-hydroxypropyl]-1,2-dihydro-3H-1,2,4-triazole), JAU6476-S-methyl (alpha-1(1-chlorocyclopropyl)-alpha-[(2-chlorophenyl)methyl]-3-(methylthio)-1H-1,2,4-triazole-1-ethanol), JAU6476 thiazocine (6-(1-chlorocyclopropyl)-6,7-dihydro-triazole-5H-[1,2,4]triazolo[5,1-b][1,3]benzothiazon-6-ol) and 1,2,4-triazole (1-H-1,2,4-triazole; pp. 11 and 19, and Figure 1, pp. 48-50). Analytical purities of the reference compounds were 99.4% for prothioconazole, 99.6% for JAU6476-desthio, 98.9% for JAU6476-S-methyl, 97.4% for JAU6476 thiazocine, and 100% for 1,2,4-triazole.

Analytical method for prothioconazole, JAU6476-desthio, JAU6476-S-methyl, and JAU6476 thiazocine. Soil samples (15 g) were extracted by shaking for one hour with acetonitrile:water:cysteine hydrochloride (800:200:0.5, v:v:w), and the slurry was centrifuged for 10 minutes (p. 19; Appendix 5, pp. 109-111). Following extraction, a mixed internal standard of prothioconazole, JAU6476-desthio, JAU6476-S-methyl, and JAU6476 thiazocine was added to an aliquot of the extract, and a 700-μL aliquot was diluted with 300 μL of water and filtered through a 0.45-μm disk. The extracts were analyzed by HPLC (Luna C18 column, 100 x 4.6 mm, 5 μ) using MS/MS detection. The mobile phase conditions for the separation consisted of mobile phase A (0.1% formic acid in water) and B (0.1% formic acid in acetonitrile) under the following gradient conditions: A:B, 55:45 to 5:95 to 55:45. Retention times were 3.5 minutes for JAU6476 thiazocine, 4.8 minutes for JAU6476-desthio, 5.4 minutes for prothioconazole, and 6.7 minutes for JAU6476-S-methyl.

Analytical method for 1,2,4-triazole. Soil samples (15 g) were sonicated for one hour at 65°C with acetonitrile:water (6:4, v:v), and the slurry was centrifuged for 10 minutes (p. 20; Appendix 6, pp. 116-117). Following extraction, a triazole internal standard was added to a 1-mL aliquot of the extract, and 4 mL of 10 mM dansyl chloride and 4 mL of 0.25 M sodium bicarbonate were added to form a dansyl triazole derivative. After sonication for 30 minutes, 1 mL of 0.5 M ammonium hydroxide was added and the derivative was partitioned with 6 mL of ethyl acetate. The ethyl acetate layer was dried through anhydrous sodium sulfate, evaporated to dryness and reconstituted in 1 mL of water:acetonitrile (1:1, v:v), and filtered through a 0.45-μm nylon Acrodisc. The extracts were analyzed by HPLC (Luna C18 column, 100 x 4.6 mm, 5 μ) using MS/MS detection. The mobile phase conditions for the separation consisted of mobile phase A (0.1% formic acid in water) and B (0.1% formic acid in acetonitrile) under the following gradient conditions: A:B, 50:50 to 30:70 to 10:90 to 50:50 (p. 21). The approximate retention time of dansyl 1,2,4-triazole was 5.4 minutes.

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The LOQ was 0.01 µg/g for all compounds in soil and the method detection limit (MDL) was 2.0 µg/kg for prothioconazole, 2.0 µg/kg for JAU6476-desthio, 1.2 µg/kg for JAU6476-S-methyl, 1.7 µg/kg for JAU6476 thiazocine, and 0.9 µg/kg for 1,2,4-triazole (pp. 22 and 25).

II. RESULTS AND DISCUSSION

1. APPLICATION MONITORS: Mean recoveries of prothioconazole from the soil pads were 82.8%, 86.2%, 82.4%, 93.6%, 73.0%, and 96.0% of the applied amount (4.8 oz. a.i./A; 110% of label rate) based on the field application calculations for the first through sixth applications, respectively (calculated from Table 6, p. 34). Corresponding recoveries as a percent of the label rate (4.36 oz. a.i./A) were 91.2%, 94.9%, 90.7%, 103.1%, 80.4%, and 105.7% (Table 6, p. 34). Mean recoveries of prothioconazole from the soil pans were 82.8%, 88.0%, 87.0%, 81.9%, 83.7%, and 91.1% of the applied amount (4.8 oz. a.i./A; 110% of label rate) based on the field application calculations for the first through sixth applications, respectively (calculated from Table 7, p. 34). Corresponding recoveries as a percent of the label rate (4.36 oz. a.i./A) were 91.2%, 96.9%, 95.8%, 90.2%, 92.2%, and 100.2% (Table 6, p. 34).

2. RECOVERY FROM FIELD SPIKES: Recoveries from field spikes prepared for JAU6476-desthio, JAU6476-S-methyl, and 1,2,4-triazole in duplicate at 50 µg/kg were 84-85%, 84-87%, and 73%, respectively, following 1211 days of storage (Table 14, p. 47). Field spikes were not prepared for prothioconazole and JAU6476 thiazocine.

3. MASS ACCOUNTING: A mass balance was not determined, because the study was conducted using non-radiolabeled material.

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Table 6. Mean concentration of prothioconazole residues expressed as µg/kg soil, at the test site.

Compound	Soil depth (cm)	Sampling times (days following the last application)															
		App 1 (-70)	App 2 (-56)	App 3 (-42)	App 4 (-28)	App 5 (-14)	App 6 (0)	3	7	14	29	63	122	239	307	427	553
Prothioconazole (JAU6476)	0-15 reps	21.5	14.5	19.9	35.0	26.5	17.2	(5.0)	(3.5)	ND	ND	ND	ND	ND	ND	ND	ND
		25.5	14.8	21.4	14.4	28.2	44.7	(6.3)	(3.0)								
		24.0	12.6	26.3	17.3	21.5	37.4	(3.6)	(3.1)								
		Mean	23.7	14.0	22.5	22.2	25.4	33.1	(5.0)								
	15-30	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30-45	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
JAU6476-desthio	0-15 reps	23.4	71.5	83.4	129.1	109.3	126.3	164.7	132.5	151.5	186.1	43.2	40.6	45.5	13.1	(2.3)	ND
		27.6	62.1	83.8	119.7	141.6	153.4	223.9	192.1	158.5	119.8	71.7	48.9	52.7	12.9	ND	(2.6)
		24.9	65.3	87.3	131.4	151.2	152.6	184.4	156.8	172.9	151.4	120.8	53.0	29.7	11.0	ND	ND
		Mean	25.3	66.3	84.8	126.7	134.0	144.1	191.0	160.5	161.0	152.4	78.6	47.5	42.6	12.3	(2.1)
	15-30 reps	NS	(3.4) ND ND	ND	ND	ND (2.3) (3.0) (2.4)	ND (3.0) ND (2.3)	ND (5.7) ND (3.2)	ND 16.3 10.2 (9.5)	ND (3.7) ND (2.6)	(4.1) ND (8.1) (4.7)	ND ND 19.7 (7.9)	ND	(6.9) (9.7) (3.4) (6.7)	ND ND (3.2) (2.4)	ND	ND
30-45		NS	ND	ND	ND	ND	ND	ND (2.2) ND (2.1)	ND	ND	ND	ND	ND	ND	ND	ND	
JAU6476-S-methyl	0-15 reps	ND	(4.1) (3.3)	(3.6) (4.1)	(8.5) (6.8)	(6.5) (7.3)	(6.8) 10.3	15.1 15.9	(9.3) 11.3	(9.2) (7.7)	(8.3) (3.7)	(1.3) (1.8)	ND	ND	ND	ND	ND

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Compound	Soil depth (cm)	Sampling times (days following the last application)															
		App 1 (-70)	App 2 (-56)	App 3 (-42)	App 4 (-28)	App 5 (-14)	App 6 (0)	3	7	14	29	63	122	239	307	427	553
	Mean		(3.9) (3.8)	(4.1) (3.9)	(6.9) (7.4)	(9.5) (7.8)	(9.2) (8.8)	11.5 14.2	10.9 10.5	(8.0) (8.3)	(4.9) (5.6)	(2.5) (1.9)					
	15-30	NS	ND	ND	ND	ND	ND	ND	ND (1.6) ND (1.3)	ND	ND	ND	ND	ND	ND	ND	ND
	30-45	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JAU6476 thiazocine 1,2,4-triazole	0-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	15-30	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	30-45	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	0-15	ND	(1.8) (1.4) (1.8) (1.7)	(2.0) (2.6) (2.1) (2.2)	(3.2) (2.4) (2.5) (2.7)	(3.1) (3.0) (2.3) (2.8)	(6.9) (4.3) (4.5) (5.2)	(3.6) (2.1) (3.3) (3.0)	(4.0) (3.3) (3.0) (3.4)	(5.7) (5.6) (4.9) (5.4)	(7.3) (4.9) (5.3) (5.8)	(4.1) (5.5) (4.1) (4.6)	(4.0) (2.6) (3.0) (3.2)	(4.6) (4.3) (4.4) (4.4)	(5.8) (6.2) (5.5) (5.8)	(2.6) (2.8) (1.4) (2.3)	(1.6) (1.2) ND (1.2)
	15-30	NS	ND (1.0) ND (0.9)	ND	(1.2) ND (1.4) (1.2)	(2.3) (2.6) (3.0) (2.6)	(2.9) (2.8) (2.6) (2.8)	(2.0) (2.6) (1.9) (2.2)	(2.5) (3.1) (1.6) (2.4)	(3.0) (3.7) (4.3) (3.7)	(1.7) (1.9) (2.3) (2.0)	(2.9) (1.7) (6.5) (3.7)	(4.8) (5.3) (4.5) (4.9)	(4.0) (3.6) (2.8) (3.5)	(3.2) (4.7) (4.0) (4.0)	(1.8) (3.9) (2.9) (2.9)	(1.6) ND (1.3) (1.3)
	30-45	NS	ND	ND	ND	(1.2) (1.7) (1.6) (1.5)	ND ND (3.8) (1.9)	ND (2.3) (1.5) (1.6)	(1.5) (1.7) (1.9) (1.7)	(1.4) (1.7) (1.1) (1.4)	(1.4) (1.7) (1.1) (1.4)	(1.8) ND (1.7) (1.5)	(1.6) (1.3) (4.4) (2.4)	(4.1) (3.2) (2.8) (3.4)	(2.7) (3.1) (2.8) (2.9)	(2.7) (1.6) ND (1.7)	(1.7) (1.3) ND (1.3)

Data were obtained from Tables 8-12, pp. 36-45 of the study report. The LOQ was 10 µg/kg. Values in parenthesis are below the LOQ (10 µg/kg) and above the MDL (2.0, 2.0, 1.2, 1.7, and 0.9 µg/kg for prothioconazole, JAU6476-desthio, JAU6476-S-methyl, JAU6476-thiazocine, and 1,2,4-triazole, respectively).

ND = Not detected, i.e. below the MDL. ND replicates are assumed to be at MDL for averaging purposes. NS = Not sampled. Total extractable and total non-extractable residues were not determined. Samples were analyzed only to a depth of 15 cm at day 0 following the first application.

4. PARENT COMPOUND: The mean concentration of prothioconazole in the 0-15 cm soil depth following the first application (at -70 days) was 23.7 µg/kg, which is 18.2% of the theoretical applied concentration, 130 µg/kg (20.1% of the theoretical concentration if applied at label rate, 118 µg/kg) (calculated from Table 8, p. 36). Mean concentrations of prothioconazole in the 0-15 cm soil depth following the second through fifth applications were 14.0 µg/kg, 22.5 µg/kg, 22.2 µg/kg, and 25.4 µg/kg, respectively. Following the sixth application, prothioconazole was detected in the 0-15 cm soil depth at a maximum mean concentration of 33.1 µg/kg at day 0, decreased to <LOQ by 3 days posttreatment and decreased to <MDL by 14 days posttreatment. Prothioconazole was not detected below the 0-15 cm soil depth.

The half-life of prothioconazole in soil under terrestrial field conditions was 2.2 days ($r^2 = 0.7642$), calculated using linear regression on all available individual replicate log-transformed prothioconazole concentrations (0-15 cm soil depth). The observed DT50 was <3 days. The observed DT90 occurred around 7 days (calculated from Table 8, p. 36-37).

5. TRANSFORMATION PRODUCTS: The major transformation product detected was **JAU6476-desthio** (2-[2-(1-chlorocyclopropyl)-3-(2-chlorophenyl)-2-hydroxypropyl]-1,2-dihydro-3H-1,2,4-triazole), with a maximum mean concentration of 28.1% of the applied parent (after converting to parent equivalents) (66.3 µg/kg), observed before the maximum total application, on the day of the second application (-56 days) in the 0-15 cm soil layer (Table 9, pp. 38-39). JAU6476-desthio was initially detected in the 0-15 cm soil depth at a mean of 25.3 µg/kg (21.5% of applied parent) immediately following the first application, increased to a mean of 144.1 µg/kg (20.4% of applied prothioconazole) following the sixth application, was at a maximum mean concentration of 191.0 µg/kg (27.0% of applied parent) by 3 days, decreased to 12.3 µg/kg (1.7% of applied parent) by 307 days posttreatment, and was <LOQ by the end of the study period (567 days post sixth application). In soil below the 0-15 cm depth, JAU6476-desthio was not detected at a mean concentration above the LOQ (10 µg/kg), but was detected above the LOQ in only three individual replicates at 10.2 µg/kg, 16.3 µg/kg, and 19.7 µg/kg during 7, 7, and 63 days posttreatment. The $t_{1/2}$ value for JAU6476-desthio was 84.5 days ($r^2 = 0.9194$), calculated using linear regression on all available replicate log-transformed data (0-15 cm soil depth) from the day with the observed individual replicate peak concentration (3DAT). The observed DT50 occurred around 63 days. The observed DT90 occurs between 239-307 days.

The transformation product **JAU6476-S-methyl** (alpha-1(1-chlorocyclopropyl)-alpha-[(2-chlorophenyl)methyl]-3-(methylthio)-1H-1,2,4-triazole-1-ethanol) was not detected above 10% of the applied prothioconazole, but was detected at mean levels above the LOQ (10 µg/kg) at 3-7 days post sixth application. JAU6476-S-methyl was initially detected in the 0-15 cm soil depth at a mean concentration of 3.8 µg/kg (1.4% of applied parent) immediately following the second application. JAU6476-S-methyl increased to a maximum mean of 14.2 µg/kg (1.7% of applied parent) at 3 days following the sixth application, then decreased to a mean of 10.5 µg/kg (1.3% of applied parent) by 7 days posttreatment, and was detected at a mean concentration below the LOQ from 14-63 days posttreatment, decreasing to <MDL by 122 days posttreatment through the end of the study period (553 days post sixth application). JAU6476-S-methyl was not detected above the LOQ in soil below the 0-15 cm depth. The $t_{1/2}$ value for JAU6476-S-methyl was 21.2

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days ($r^2 = 0.9153$), calculated using linear regression on all available replicate log-transformed data (0-15 cm soil depth) from the day with the observed individual replicate peak concentration (3DAT). The observed DT50 occurred between 14-29 days. The observed DT90 was around 63 days.

The minor transformation product 1,2,4-triazole (1-H-1,2,4-triazole) was not detected above the LOQ at any sampling interval, but was detected at levels below the LOQ but above the MDL throughout the study in the all soil depths to 45 cm, with a maximum mean concentration of 5.8 $\mu\text{g/kg}$ (3.7% of applied parent) at 29 and 307 days after the sixth application, and a final concentration of 1.2 $\mu\text{g/kg}$ (0.7% of applied parent) at the end of the study period (553 days post sixth application). JAU6476-thiazocine was not detected above the MDL in any sampling interval at any depth.

Transformation product concentrations were converted to parent equivalents by adjusting for molecular weight (see Comment 1 for sample calculation).

Table 7: Chemical names and CAS numbers for the transformation products of prothioconazole.

Applicant's Code Name	CAS Number	CAS and/or IUPAC Chemical Name(s)	Chemical formula	Molecular weight	SMILES string
JAU6476-desthio	NA	2-[2-(1-Chlorocyclopropyl)-3-(2-chlorophenyl)-2-hydroxypropyl]-1,2-dihydro-3H-1,2,4-triazole	$\text{C}_{14}\text{H}_{15}\text{Cl}_2\text{N}_3\text{O}$	312.2	See Attachment 1
JAU6476-S-methyl	NA	Alpha-1(1-chlorocyclopropyl)-alpha-[(2-chlorophenyl)methyl]-3-(methylthio)-1H-1,2,4-triazole-1-ethanol	$\text{C}_{15}\text{H}_{17}\text{Cl}_2\text{N}_3\text{OS}$	358.3	See Attachment 1
JAU6476 thiazocine	NA	6-(1-Chlorocyclopropyl)-6,7-dihydro-triazole-5H-[1,2,4]triazolo[5,1-b][1,3]benzothiazon-6-ol	$\text{C}_{14}\text{H}_{14}\text{N}_3\text{ClOS}$	307.8	See Attachment 1
1,2,4-triazole	NA	1-H-1,2,4-triazole	$\text{C}_2\text{H}_3\text{N}_3$	69.1	See Attachment 1

Data were obtained from Figure 1, pp. 48-51 of the study report.

6. EXTRACTABLE AND NON-EXTRACTABLE RESIDUES: Non-extractable residues were not measured.

Table 8: Dissipation routes of prothioconazole under field conditions.

Route of dissipation	% of applied amount (at the end of study period)
	Test site

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	% of applied amount (at the end of study period)
Accumulation (residues) in soil/carry over ¹	0%
Transformation ¹	0.9% (0.7% as 1,2,4-triazole; 0.2% as JAU6476-desthio)
Leaching, if measured	No residues of the parent or transformation products were detected above the LOQ in soil below the 0-15 cm depth at any sampling interval.
Volatilization, if measured	Not measured
Plant uptake, if measured	N/A
Run off, if measured	Not measured
Total	

Data were obtained from Tables 8-12, pp. 36-45 of the study report.

¹ Calculated as a percent of the total applied prothioconazole, based on six applications (130 µg a.i./kg x 6 applications = 780 µg a.i./kg).

7. VOLATILIZATION: The concentration of applied prothioconazole lost through volatilization was not determined.

8. PLANT UPTAKE: N/A.

9. LEACHING: Three individual replicates of JAU6476-desthio were detected above the LOQ at 7, 7, and 63 days posttreatment. No other residues of the parent or transformation products were detected above the LOQ in soil below the 0-15 cm depth at any sampling interval (Tables 8-12, pp. 36-45). However, JAU6476-desthio was detected sporadically above the MDL in the 15-30 cm soil depth and 1,2,4-triazole was detected above the MDL at almost every sampling interval in both the 15-30 cm and 30-45 cm soil depths.

10. RUN OFF: Run off was not studied.

11. RESIDUE CARRYOVER: At the end of the study period, 553 days after the sixth application, the total carryover of the parent and transformation products was 0% and 0.9% of the total applied prothioconazole (based on six applications), respectively (calculated from Tables 8-12, pp. 36-45). The only transformation products detected above MDL (in individual replicates) at the end of the study period were 1,2,4-triazole (0.7% of applied) and JAU6476-desthio (0.2% of applied). Observed DT90 values were about 7 days, 239-307 days, and 63 days for prothioconazole, prothioconazole-desthio, and prothioconazole-S-methyl, respectively (p. 26; Figure 15, p. 79).

12. SUPPLEMENTARY STUDY RESULTS: The laboratory storage stability study was inadequate to demonstrate stability of any of the analytes during storage because samples were not analyzed at time 0 to determine initial recoveries, and were analyzed only at one time point (with the exception of JAU6476 thiazocine, which was analyzed at two time points; Table 14, p. 47). Recovery of prothioconazole was 25% following 644 days, recovery of JAU6476 thiazocine

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was 85-94% following 644-883 days, and recoveries of JAU6476-desthio, JAU6476-S-methyl, and 1,2,4-triazole were 74-76% following 802-804 days of frozen storage.

Mean recoveries for the additional method validation study at the 10 µg/kg fortification level were 109.6%, 102.5%, 105.7%, 113.4%, and 101.9% for prothioconazole, JAU6476-desthio, JAU6476-S-methyl, JAU6476 thiazocine, and 1,2,4-triazole, respectively (p. 24; Table 8, p. 35). Mean recoveries at the 100 µg/kg fortification level were 96.3%, 92.6%, 93.9%, 97.2%, and 91.6% for prothioconazole, JAU6476-desthio, JAU6476-S-methyl, JAU6476 thiazocine, and 1,2,4-triazole, respectively.

Recoveries from soil samples that were fortified with prothioconazole, JAU6476-desthio, JAU6476-S-methyl, JAU6476 thiazocine, and 1,2,4-triazole at 50 µg/kg and analyzed concurrently with the test samples ranged from 89-103% for prothioconazole, 87-102% for JAU6476-desthio, 90-102% for JAU6476-S-methyl, 89-99% for JAU6476 thiazocine, and 70-107% for 1,2,4-triazole (p. 25).

III. STUDY DEFICIENCIES:

The laboratory storage stability study was inadequate to demonstrate stability of any of the analytes during storage because samples were not analyzed at time 0 to determine initial recoveries, and sampling intervals were inadequate to determine stability over time.

Of particular concern, prothioconazole was not shown to be stable in soil samples stored frozen for any length of time, with a recovery of 25% following 644 days of storage (Table 14, p. 47). In this study, prothioconazole was in storage up to 1092 days before analysis. While prothioconazole can be expected to degrade rapidly to JAU6476-desthio under field conditions, it is necessary to demonstrate the stability of prothioconazole under typical storage conditions to ensure that the degradation of the parent occurred in the field and not during storage of the test samples. If the parent compound degraded during storage of the samples, then the calculated half-life value will not correctly reflect dissipation in the field.

IV. REVIEWER'S COMMENTS:

1. Laboratory storage stability samples were analyzed only at one or two time points. Laboratory storage stability samples should be analyzed at time 0 and up to at least the maximum storage interval for test samples, with a sufficient number of intervals in between, to allow the reviewer to determine stability of the analytes over time.

The sum of prothioconazole and JAU6476-desthio residues detected immediately following the first application (at -70 days) accounted for only 39.7% of the applied amount (18.2% as prothioconazole and 21.5% as JAU6476-desthio), whereas recoveries from soil pads and pans indicate that the test compound was applied at an average of 82.8% of the theoretical target application amount (calculated from Table 6, p. 34). No other transformation products were detected above the LOQ immediately following the first application. This suggests that residues could have been lost from field samples

Data Evaluation Report on the terrestrial field dissipation of prothioconazole

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during sample storage, which was 1064 days for the -70 days sampling interval (directly after the first application) (Table 8, pp. 36-37). Part of the missing starting material can be attributed to non-extractable residues. The study author states, without supporting data, that in an experiment to test the binding of ^{14}C -labeled prothioconazole to soil, whereby control soil was fortified and immediately analyzed for the parent, the time 0 recovery indicated that 25% of the applied radioactivity was bound to the soil (pp. 23 and 26).

The stability of the transformation products JAU6476-desthio, JAU6476-S-methyl, and 1,2,4-triazole was reported 84%, 87%, and 73%, respectively, after 1211 days of storage, based on recoveries from field spikes that were fortified in the laboratory, then sent to the field site and kept under the same conditions as the field samples. JAU6476-thiazocine was reported 85-86% stable after 883 days of storage, based on fortified spikes which were not shipped to the field (Table 14, p. 47).

2. To determine percentage of the applied values for the transformation products, transformation product concentration values were converted to parent equivalents by multiplying the transformation product concentrations by the corresponding parent-to-degradate molecular weight ratios. The ratios were calculated by dividing the molecular weight of the parent (344.3 g/mol) by the molecular weight of the transformation product (312.2, 358.3, 307.8, and 69.1 g/mol for JAU6476-desthio, JAU6476-S-methyl, JAU6476 thiazocine, and 1,2,4-triazole, respectively). For example, for JAU6476-desthio, 312.2 g/mol divided by 344.3 g/mol equals 0.91. So, 23.4 $\mu\text{g/kg}$ of JAU6476-desthio (detection at day -70, 0-15 cm soil depth, first replicate) is converted to 25.8 $\mu\text{g/kg}$ parent equivalents by multiplying by 344.3/312.2.

The percent of each transformation product in terms of percent of the applied prothioconazole was calculated by dividing the concentration of the transformation product in parent equivalents by the theoretical applied concentration of prothioconazole in the 0-15 cm soil depth (130.0 $\mu\text{g a.i./kg}$; calculated based on the site-specific bulk density of the 0-15 cm soil depth (1.70 g/cm^3) and the applied rate (4.8 oz a.i./A, i.e., 110% of label rate)). For example, for JAU6476-desthio, 25.8 $\mu\text{g/kg}$ parent equivalents (detection at day -70, 0-15 cm soil depth, first replicate; see above calculation) divided by 130.0 $\mu\text{g a.i./kg}$ = 0.199 or 19.9% of the theoretically applied prothioconazole, based on one application. To represent transformation products as percent of labelled rate, the same calculations are repeated using label application rate (4.36 oz a.i./A), instead of theoretically applied rate, to obtain a labelled rate concentration of 118.0 $\mu\text{g a.i./kg}$. For example, for JAU6476-desthio, 25.8 $\mu\text{g/kg}$ parent equivalents (detection at day -70, 0-15 cm soil depth, first replicate; see above calculation) divided by 118.0 $\mu\text{g a.i./kg}$ = 0.219 or 21.9% of the labelled rate of prothioconazole, based on one application.

3. Tank mix samples were collected but not analyzed because analyses of the verification pads and pans showed that the applications were satisfactory, as stated by the study author (pp. 14 and 24).

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4. While this study used a 14-day re-application interval, the current proposed label allows re-application in as little as 5-day intervals. It is possible that the field dissipation pattern of prothioconazole may be altered, if applied at shorter intervals.
5. The reviewer notes that two additional field dissipation studies were conducted on bare plots, one following six applications of the test substance at a test site in New York (MRID 46246519), and one following two applications of the test substance at a test site in Georgia (MRID 46246518).

V. REFERENCES:

1. U.S. Environmental Protection Agency. 1982. Pesticide Assessment Guidelines, Subdivision N, Chemistry: Environmental Fate, Section 164-1, Terrestrial Field Dissipation Studies. Office of Pesticide and Toxic Substances, Washington, DC. EPA 540/9-82-021.
2. U.S. Environmental Protection Agency. 1993. Pesticide Registration Rejection Rate Analysis - Environmental Fate. Office of the Prevention, Pesticides, and Toxic Substances, Washington, DC. EPA 738-R-93-010.
3. U.S. Environmental Protection Agency. 1989. FIFRA Accelerated Reregistration, Phase 3 Technical Guidance. Office of the Prevention, Pesticides, and Toxic Substances, Washington, DC. EPA 540/09-90-078.

Attachment 1

Structures of Parent and Transformation Products

Data Evaluation Report on the terrestrial field dissipation of prothioconazole

PMRA Submission Number N/A

EPA MRID Number 46246517

Prothioconazole [JAU6476]

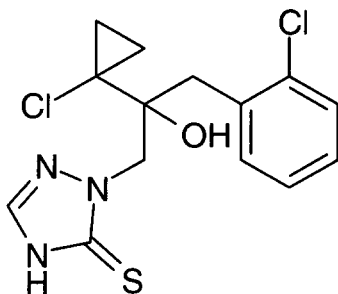
IUPAC name: (RS)-2-[2-(1-Chlorocyclopropyl)-3-(2-chlorophenyl)-2-hydroxypropyl]-2,4-dihydro-3H-1,2,4-triazole-3-thione.

CAS name: 2-[2-(1-Chlorocyclopropyl)-3-(2-chlorophenyl)-2-hydroxypropyl]-1,2-dihydro-3H-1,2,4-triazole-3-thione.

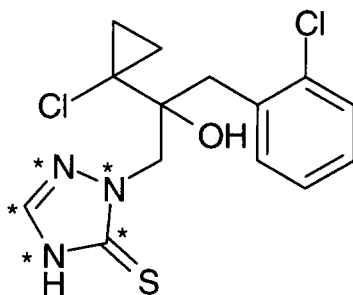
CAS No: 178928-70-6.

SMILES string: ClC1(C(Cc2ccccc2Cl)(CN2N=CNC2=S)O)CC1.

Unlabeled



[Triazole-1,2,4-¹⁵N,3,5-¹³C]JAU6476



*Position of radiolabel.

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PMRA Submission Number N/A

EPA MRID Number 46246517

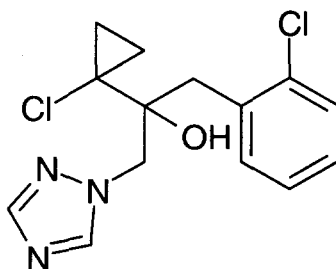
JAU6476-desthio [SXX0665]

IUPAC name: Not reported.

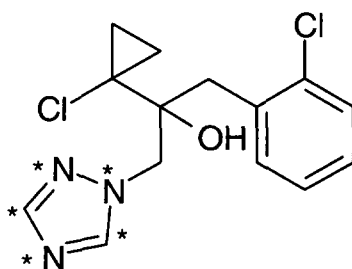
CAS name: 2-[2-(1-Chlorocyclopropyl)-3-(2-chlorophenyl)-2-hydroxypropyl]-1,2-dihydro-3H-1,2,4-triazole.

CAS No.: Not reported.

Unlabeled



[1,2,4-¹⁵N₃,3,5-¹³C₂]JAU6476-desthio



*Position of radiolabel.

Data Evaluation Report on the terrestrial field dissipation of prothioconazole

PMRA Submission Number N/A

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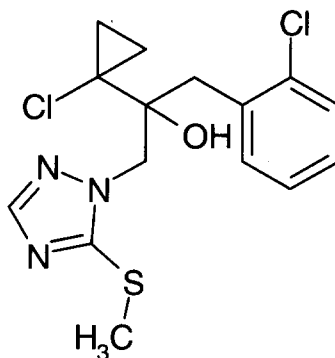
JAU6476-S-methyl or S-methyl-JAU6476 [KTS9473; WAK7681]

IUPAC name: Not reported.

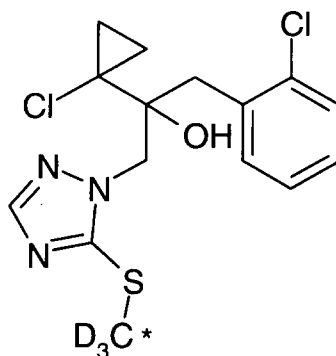
CAS name: alpha-1(1-Chlorocyclopropyl)-alpha-[(2-chlorophenyl)methyl]-3-(methylthio)-1H-1,2,4-triazole-1-ethanol.

CAS No.: Not reported.

Unlabeled



[Methyl-d₃-¹³C]JAU6476-S-methyl or [Methyl-d₃-¹³C]S-methyl-JAU6476



*Position of radiolabel; D = deuterium; ²H.

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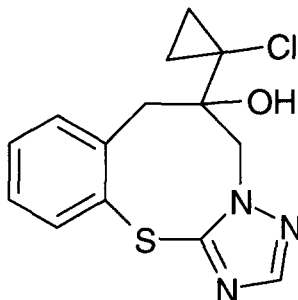
JAU6476-thiazocine

IUPAC name: Not reported.

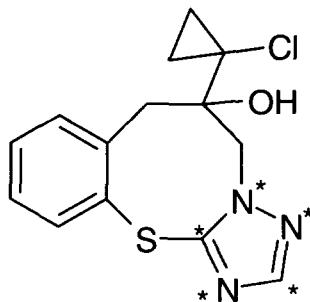
CAS name: 6-(1-Chlorocyclopropyl)-6,7-dihydro-triazole-5H-[1,2,4]triazolo[5,1-b][1,3]benzothiazon-6-ol.

CAS No.: Not reported.

Unlabeled



[Thiazocine-¹⁵N₃-¹³C₂]JAU6476-thiazocine



*Position of radiolabel.

Data Evaluation Report on the terrestrial field dissipation of prothioconazole

PMRA Submission Number N/A

EPA MRID Number 46246517

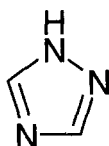
1,2,4-triazole or 1-H-1,2,4-triazole

IUPAC name: Not reported.

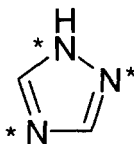
CAS name: 1-H-1,2,4-triazole.

CAS No.: Not reported.

Unlabeled



[1,2,4-¹⁵N₃]1,2,4-triazole or [1,2,4-¹⁵N₃]1-H-1,2,4-triazole



*Position of radiolabel.

Chemical Name Prothioconazole
 PC Code 113961
 MRID 46246517
 Guideline No. 164-1

California field site

Half-life (days) = 2.2 * 0- to 15-cm soil depth

Days	Prothioconazole (ppb)	Ln (Prothioconazole)
-70	21.5	3.07
-70	25.5	3.24
-70	24.0	3.18
-56	14.5	2.67
-56	14.8	2.69
-56	12.6	2.53
-42	19.9	2.99
-42	21.4	3.06
-42	26.3	3.27
-28	35.0	3.56
-28	14.4	2.67
-28	17.3	2.85
-14	26.5	3.28
-14	28.2	3.34
-14	21.5	3.07
0	17.2	2.84
0	44.7	3.80
0	37.4	3.62
3	5.0	1.61
3	6.3	1.84
3	3.6	1.28
7	3.5	1.25
7	3.0	1.10
7	3.1	1.13
14	<MDL	---
14	<MDL	---
14	<MDL	---
29	<MDL	---
29	<MDL	---
29	<MDL	---
63	<MDL	---
63	<MDL	---
63	<MDL	---
122	<MDL	---
122	<MDL	---
122	<MDL	---
239	<MDL	---
239	<MDL	---
239	<MDL	---
307	<MDL	---
307	<MDL	---
307	<MDL	---
427	<MDL	---
427	<MDL	---
427	<MDL	---
553	<MDL	---
553	<MDL	---
553	<MDL	---

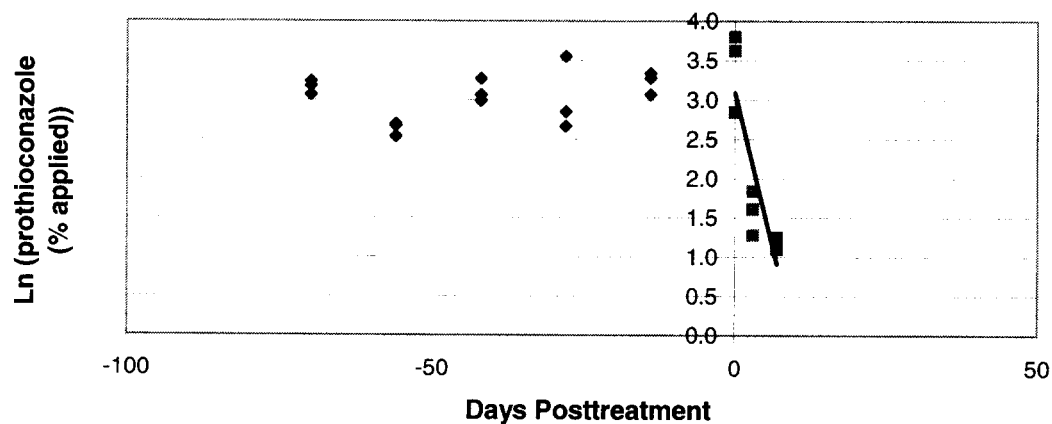
Data obtained from Table 8, pp. 36-37 of the study report.

LOQ= 10 ppb; MDL= 2.0 ppb.

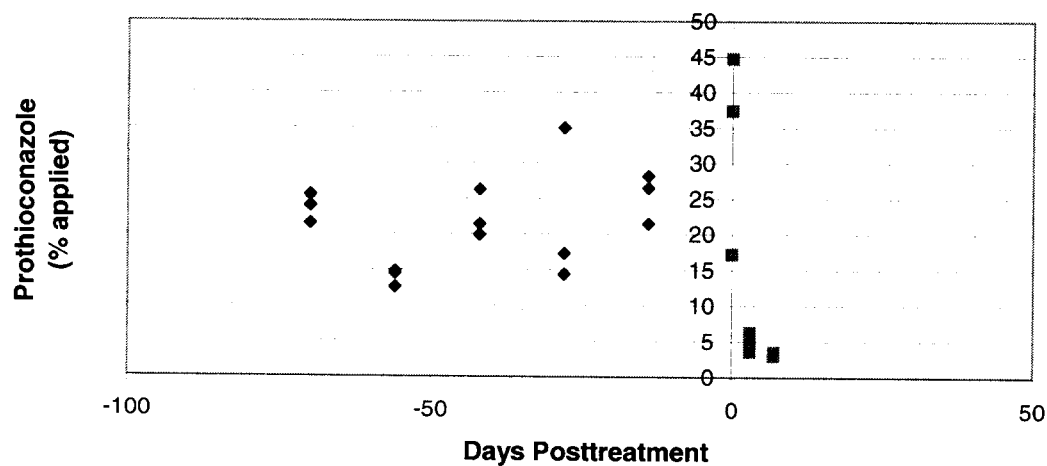
Chemical Name Prothioconazole
PC Code 113961
MRID 46246517
Guideline No. 164-1

**Dissipation of prothioconazole following six applications in California
(0- to 15-cm soil depth)**

$$y = -0.3112x + 3.0907$$
$$R^2 = 0.7642$$



**Dissipation of prothioconazole following six applications in California
(0- to 15-cm soil depth)**



Chemical Name Prothioconazole
 PC Code 113961
 MRID 46246517
 Guideline No. 164-1

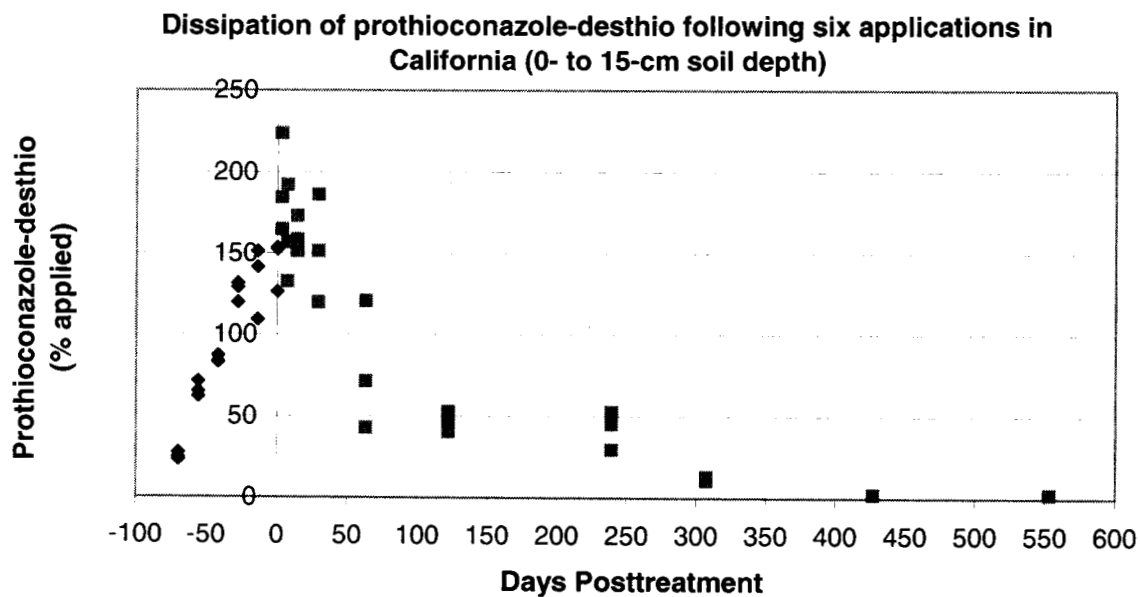
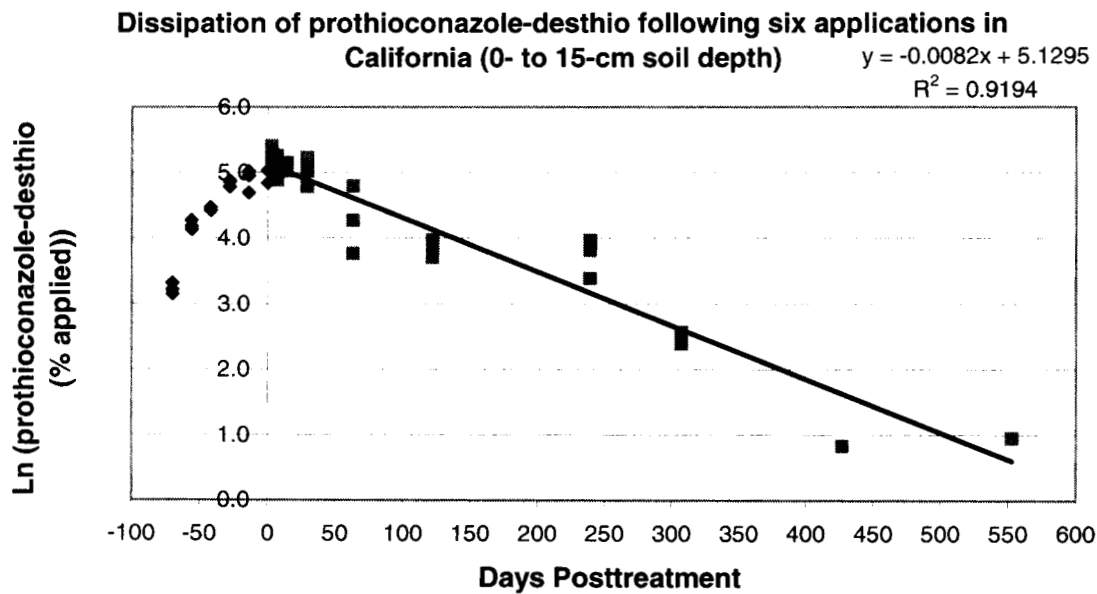
California field site

Half-life (days) = 84.5 * 0- to 15-cm soil depth
(calculated from day with concentration peak, 3DAT)

Days	Prothioconazole-desthio (ppb)	Ln (Prothioconazole-desthio)
-70	23.4	3.15
-70	27.6	3.32
-70	24.9	3.21
-56	71.5	4.27
-56	62.1	4.13
-56	65.3	4.18
-42	83.4	4.42
-42	83.8	4.43
-42	87.3	4.47
-28	129.1	4.86
-28	119.7	4.78
-28	131.4	4.88
-14	109.3	4.69
-14	141.6	4.95
-14	151.2	5.02
0	126.3	4.84
0	153.4	5.03
0	152.6	5.03
3	164.7	5.10
3	223.9	5.41
3	184.4	5.22
7	132.5	4.89
7	192.1	5.26
7	156.8	5.05
14	151.5	5.02
14	158.5	5.07
14	172.9	5.15
29	186.1	5.23
29	119.8	4.79
29	151.4	5.02
63	43.2	3.77
63	71.7	4.27
63	120.8	4.79
122	40.6	3.70
122	48.9	3.89
122	53.0	3.97
239	45.5	3.82
239	52.7	3.96
239	29.7	3.39
307	13.1	2.57
307	12.9	2.56
307	11.0	2.40
427	2.3	0.83
427	<MDL	---
427	<MDL	---
553	<MDL	---
553	2.6	0.96
553	<MDL	---

Data obtained from Table 9, pp. 38-39 of the study report.
 LOQ= 10 ppb; MDL= 2.0 ppb.

Chemical Name	Prothioconazole
PC Code	113961
MRID	46246517
Guideline No.	164-1



Chemical Name Prothioconazole
 PC Code 113961
 MRID 46246517
 Guideline No. 164-1

California field site

Half-life (days) = 21.2 * 0- to 15-cm soil depth
 (calculated from day with concentration peak, 3DAT)

Days	Prothioconazole-S-methyl (ppb)	Ln (Prothioconazole-S-methyl)
-70	<MDL	---
-70	<MDL	---
-70	<MDL	---
-56	4.1	1.41
-56	3.3	1.19
-56	3.9	1.36
-42	3.6	1.28
-42	4.1	1.41
-42	4.1	1.41
-28	8.5	2.14
-28	6.8	1.92
-28	6.9	1.93
-14	6.5	1.87
-14	7.3	1.99
-14	9.5	2.25
0	6.8	1.92
0	10.3	2.33
0	9.2	2.22
3	15.1	2.71
3	15.9	2.77
3	11.5	2.44
7	9.3	2.23
7	11.3	2.42
7	10.9	2.39
14	9.2	2.22
14	7.7	2.04
14	8.0	2.08
29	8.3	2.12
29	3.7	1.31
29	4.9	1.59
63	1.3	0.26
63	1.8	0.59
63	2.5	0.92
122	<MDL	---
122	<MDL	---
122	<MDL	---
239	<MDL	---
239	<MDL	---
239	<MDL	---
307	<MDL	---
307	<MDL	---
307	<MDL	---
427	<MDL	---
427	<MDL	---
427	<MDL	---
553	<MDL	---
553	<MDL	---
553	<MDL	---

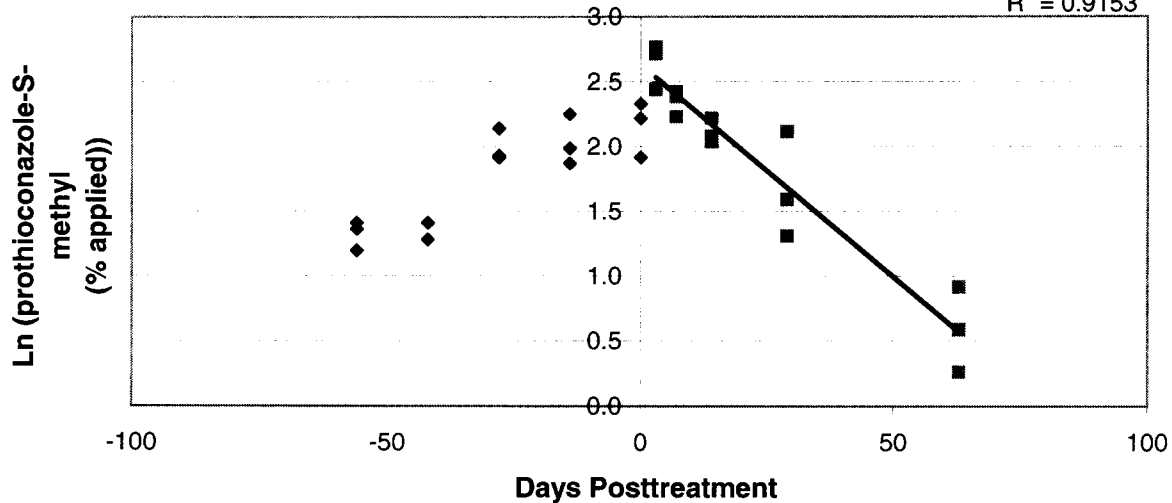
Data obtained from Table 10, pp. 40-41 of the study report.
 LOQ= 10 ppb; MDL= 1.2 ppb.

Chemical Name	Prothioconazole
PC Code	113961
MRID	46246517
Guideline No.	164-1

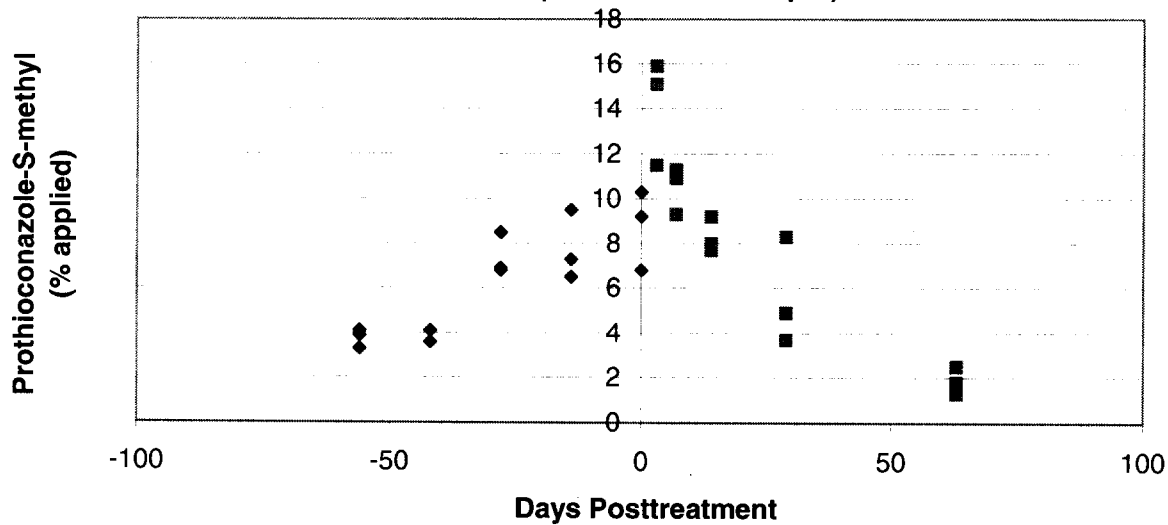
Dissipation of prothioconazole-S-methyl following six applications in California (0- to 15-cm soil depth)

$$y = -0.0327x + 2.6322$$

$$R^2 = 0.9153$$



Dissipation of prothioconazole-S-methyl following six applications in California (0- to 15-cm soil depth)



Chemical Name Prothioconazole
PC Code 113961
MRID 46246517
Guideline No. 164-1

Prothioconazole application verification, as % of label rate (4.36 oz. a.i./A).

Application 1	A	B	C	D	E	AVR
pads	98.1	85.0	98.7	92.1	82.0	91.2
pans	83.1	95.6	84.2	100.8	92.2	91.2
Application 2						
pads	90.7	90.4	95.8	89.9	107.9	94.9
pans	86.4	103.7	108.2	72.2	113.9	96.9
Application 3						
pads	90.1	91.8	84.1	89.1	98.5	90.7
pans	102.7	87.6	93.9	90.9	103.7	95.8
Application 4						
pads	99.5	94.2	107.0	110.5	104.1	103.1
pans	92.6	88.0	101.6	79.8	89.1	90.2
Application 5						
pads	80.6	71.3	85.4	81.8	82.9	80.4
pans	85.7	88.4	101.6	97.1	88.2	92.2
Application 6						
pads	102.8	107.9	108.4	109.9	99.4	105.7
pans	99.8	104.9	98.8	101.5	96.2	100.2

Data obtained from Table 6, pp. 34 of the study report.

Prothioconazole application verification, as % of applied rate (4.8 oz. a.i./A).

Application 1	A	B	C	D	E	AVR
pads	89.1	77.2	89.7	83.7	74.5	82.8
pans	75.5	86.8	76.5	91.6	83.7	82.8
Application 2						
pads	82.4	82.1	87.0	81.7	98.0	86.2
pans	78.5	94.2	98.3	65.6	103.5	88.0
Application 3						
pads	81.8	83.4	76.4	80.9	89.5	82.4
pans	93.3	79.6	85.3	82.6	94.2	87.0
Application 4						
pads	90.4	85.6	97.2	100.4	94.6	93.6
pans	84.1	79.9	92.3	72.5	80.9	81.9
Application 5						
pads	73.2	64.8	77.6	74.3	75.3	73.0
pans	77.8	80.3	92.3	88.2	80.1	83.7
Application 6						
pads	93.4	98.0	98.5	99.8	90.3	96.0
pans	90.7	95.3	89.7	92.2	87.4	91.1

Calculated from data obtained from Table 6, pp. 34 of the study report.

Chemical Name Prothioconazole
 PC Code 113961
 MRID 46246517
 Guideline No. 164-1

**Difference between pad and pan prothioconazole application verification,
 as % of label rate (4.36 oz. a.i./A).**

Application 1	A	B	C	D	E	AVR
Δ	-15.0	10.6	-14.5	8.7	10.2	0.0
Application 2						
Δ	-4.3	13.3	12.4	-17.7	6.0	1.9
Application 3						
Δ	12.6	-4.2	9.8	1.8	5.2	5.0
Application 4						
Δ	-6.9	-6.2	-5.4	-30.7	-15.0	-12.8
Application 5						
Δ	5.1	17.1	16.2	15.3	5.3	11.8
Application 6						
Δ	-3.0	-3.0	-9.6	-8.4	-3.2	-5.4

Calculated from data obtained from Table 6, pp. 34 of the study report.

**Difference between pad and pan prothioconazole application verification,
 as % of applied rate (4.8 oz. a.i./A).**

Application 1	A	B	C	D	E	AVR
Δ	-13.6	9.6	-13.2	7.9	9.3	0.0
Application 2						
Δ	-3.9	12.1	11.3	-16.1	5.5	1.8
Application 3						
Δ	11.4	-3.8	8.9	1.6	4.7	4.6
Application 4						
Δ	-6.3	-5.6	-4.9	-27.9	-13.6	-11.7
Application 5						
Δ	4.6	15.5	14.7	13.9	4.8	10.7
Application 6						
Δ	-2.7	-2.7	-8.7	-7.6	-2.9	-4.9

Calculated from data obtained from Table 6, pp. 34 of the study report.

Chemical Name Prothioconazole
PC Code 113961
MRID 46246517
Guideline No. 164-1

Molecular weight:	amu
Prothioconazole	344.3
Prothioconazole-desthio	312.2
Prothioconazole-S-methyl	358.3
Prothioconazole- thiazocine	307.8
1,2,4-triazole	69.1

Prothioconazole and transformation products expressed as concentrations.

(0-15 cm; no detections >LOQ below 15 cm)

Days	App. No.	Prothioconazole applied (ppb)	Prothioconazole (ppb)	Prothioconazole-desthio (ppb)	Prothioconazole-S-methyl (ppb)	Prothioconazole-thiazocine (ppb)	1,2,4-triazole (ppb)
-70	1	130.0	21.5	23.4	<MDL	<MDL	<MDL
-70	1	130.0	25.5	27.6	<MDL	<MDL	<MDL
-70	1	130.0	24.0	24.9	<MDL	<MDL	<MDL
-70 AVR	1	130.0	23.7	25.3	<MDL	<MDL	<MDL
-56	2	259.9	14.5	71.5	4.1	<MDL	1.8
-56	2	259.9	14.8	62.1	3.3	<MDL	1.4
-56	2	259.9	12.6	65.3	3.9	<MDL	1.8
-56 AVR	2	259.9	14.0	66.3	3.8	<MDL	1.7
-42	3	389.9	19.9	83.4	3.6	<MDL	2.0
-42	3	389.9	21.4	83.8	4.1	<MDL	2.6
-42	3	389.9	26.3	87.3	4.1	<MDL	2.1
-42 AVR	3	502.1	22.5	84.8	3.9	<MDL	2.2
-28	4	519.8	35.0	129.1	8.5	<MDL	3.2
-28	4	519.8	14.4	119.7	6.8	<MDL	2.4
-28	4	519.8	17.3	131.4	6.9	<MDL	2.5
-28 AVR	4	669.5	22.2	126.7	7.4	<MDL	2.7
-14	5	649.8	26.5	109.3	6.5	<MDL	3.1
-14	5	649.8	28.2	141.6	7.3	<MDL	3.0
-14	5	649.8	21.5	151.2	9.5	<MDL	2.3
-14 AVR	5	649.8	25.4	134.0	7.8	<MDL	2.8
0	6	779.8	17.2	126.3	6.8	<MDL	6.9
0	6	779.8	44.7	153.4	10.3	<MDL	4.3
0	6	779.8	37.4	152.6	9.2	<MDL	4.5
0 AVR	6	779.8	33.1	144.1	8.8	<MDL	5.2
3	n/a	779.8	5.0	164.7	15.1	<MDL	3.6
3	n/a	779.8	6.3	223.9	15.9	<MDL	2.1
3	n/a	779.8	3.6	184.4	11.5	<MDL	3.3
3 AVR	n/a	779.8	5.0	191.0	14.2	<MDL	3.0
7	n/a	779.8	3.5	132.5	9.3	<MDL	4.0
7	n/a	779.8	3.0	192.1	11.3	<MDL	3.3
7	n/a	779.8	3.1	156.8	10.9	<MDL	3.0
7 AVR	n/a	779.8	3.2	160.5	10.5	<MDL	3.4
14	n/a	779.8	<MDL	151.5	9.2	<MDL	5.7
14	n/a	779.8	<MDL	158.5	7.7	<MDL	5.6
14	n/a	779.8	<MDL	172.9	8.0	<MDL	4.9
14 AVR	n/a	779.8	<MDL	161.0	8.3	<MDL	5.4
29	n/a	779.8	<MDL	186.1	8.3	<MDL	7.3
29	n/a	779.8	<MDL	119.8	3.7	<MDL	4.9
29	n/a	779.8	<MDL	151.4	4.9	<MDL	5.3
29 AVR	n/a	779.8	<MDL	152.4	5.6	<MDL	5.8
63	n/a	779.8	<MDL	43.2	1.3	<MDL	4.1
63	n/a	779.8	<MDL	71.7	1.8	<MDL	5.5
63	n/a	779.8	<MDL	120.8	2.5	<MDL	4.1
63 AVR	n/a	779.8	<MDL	78.6	1.9	<MDL	4.6
122	n/a	779.8	<MDL	40.6	<MDL	<MDL	4.0
122	n/a	779.8	<MDL	48.9	<MDL	<MDL	2.6
122	n/a	779.8	<MDL	53.0	<MDL	<MDL	3.0
122 AVR	n/a	779.8	<MDL	47.5	<MDL	<MDL	3.2
239	n/a	779.8	<MDL	45.5	<MDL	<MDL	4.6
239	n/a	779.8	<MDL	52.7	<MDL	<MDL	4.3
239	n/a	779.8	<MDL	29.7	<MDL	<MDL	4.4
239 AVR	n/a	779.8	<MDL	42.6	<MDL	<MDL	4.4
307	n/a	779.8	<MDL	13.1	<MDL	<MDL	5.8
307	n/a	779.8	<MDL	12.9	<MDL	<MDL	6.2
307	n/a	779.8	<MDL	11.0	<MDL	<MDL	5.5
307 AVR	n/a	779.8	<MDL	12.3	<MDL	<MDL	5.8
427	n/a	779.8	<MDL	2.3	<MDL	<MDL	2.6
427	n/a	779.8	<MDL	<MDL	<MDL	<MDL	2.8
427	n/a	779.8	<MDL	<MDL	<MDL	<MDL	1.4
427 AVR	n/a	779.8	<MDL	2.1	<MDL	<MDL	2.3
553	n/a	779.8	<MDL	<MDL	<MDL	<MDL	1.6
553	n/a	779.8	<MDL	2.6	<MDL	<MDL	1.2
553	n/a	779.8	<MDL	<MDL	<MDL	<MDL	<MDL
553 AVR	n/a	779.8	<MDL	2.2	<MDL	<MDL	1.2

Data obtained from Tables 8-12, pp. 36-45, and calculated from data obtained from p. 25-26 of the study report.

LOQ= 10 ppb; MDL= 2.0, 2.0, 1.2, 1.7, and 0.9 ppb for prothioconazole, -desthio, -S-methyl, -thiazocine, and 1,2,4-triazole, respectively.

Chemical Name Prothioconazole
PC Code 113961
MRID 46246517
Guideline No. 164-1

Prothioconazole and transformation products expressed as a percent of theoretically applied (4.8 oz. a.i./A) prothioconazole.
(0-15 cm; no detections >LOQ below 15 cm)

Days	App. No.	Prothioconazole applied (ppb)	Prothioconazole (%)	Prothioconazole-desthio (%)	Prothioconazole-S-methyl (%)	Prothioconazole-thiazocine (%)	1,2,4-triazole (%)	TOTAL (%)
-70	1	130.0	16.5	19.9	<MDL	<MDL	<MDL	36.4
-70	1	130.0	19.6	23.4	<MDL	<MDL	<MDL	43.0
-70	1	130.0	18.5	21.1	<MDL	<MDL	<MDL	39.6
-70 AVR	1	130.0	18.2	21.5	<MDL	<MDL	<MDL	39.7
-56	2	259.9	5.6	30.3	1.5	<MDL	3.5	40.9
-56	2	259.9	5.7	26.3	1.2	<MDL	2.7	35.9
-56	2	259.9	4.8	27.7	1.4	<MDL	3.5	37.4
-56 AVR	2	259.9	5.4	28.1	1.4	<MDL	3.2	38.1
-42	3	389.9	5.1	23.6	0.9	<MDL	2.6	32.1
-42	3	389.9	5.5	23.7	1.0	<MDL	3.3	33.5
-42	3	389.9	6.7	24.7	1.0	<MDL	2.7	35.1
-42 AVR	3	502.1	5.8	24.0	1.0	<MDL	2.9	33.6
-28	4	519.8	6.7	27.4	1.6	<MDL	3.1	38.8
-28	4	519.8	2.8	25.4	1.3	<MDL	2.3	31.7
-28	4	519.8	3.3	27.9	1.3	<MDL	2.4	34.9
-28 AVR	4	669.5	4.3	26.9	1.4	<MDL	2.6	35.1
-14	5	649.8	4.1	18.5	1.0	<MDL	2.4	26.0
-14	5	649.8	4.3	24.0	1.1	<MDL	2.3	31.8
-14	5	649.8	3.3	25.7	1.4	<MDL	1.8	32.1
-14 AVR	5	649.8	3.9	22.7	1.1	<MDL	2.1	30.0
0	6	779.8	2.2	17.9	0.8	<MDL	4.4	25.3
0	6	779.8	5.7	21.7	1.3	<MDL	2.7	31.4
0	6	779.8	4.8	21.6	1.1	<MDL	2.9	30.4
0 AVR	6	779.8	4.2	20.4	1.1	<MDL	3.3	29.0
3	n/a	779.8	0.6	23.3	1.9	<MDL	2.3	28.1
3	n/a	779.8	0.8	31.7	2.0	<MDL	1.3	35.8
3	n/a	779.8	0.5	26.1	1.4	<MDL	2.1	30.1
3 AVR	n/a	779.8	0.6	27.0	1.7	<MDL	1.9	31.3
7	n/a	779.8	0.4	18.7	1.1	<MDL	2.6	22.9
7	n/a	779.8	0.4	27.2	1.4	<MDL	2.1	31.1
7	n/a	779.8	0.4	22.2	1.3	<MDL	1.9	25.8
7 AVR	n/a	779.8	0.4	22.7	1.3	<MDL	2.2	26.6
14	n/a	779.8	<MDL	21.4	1.1	<MDL	3.6	26.2
14	n/a	779.8	<MDL	22.4	0.9	<MDL	3.6	26.9
14	n/a	779.8	<MDL	24.5	1.0	<MDL	3.1	28.6
14 AVR	n/a	779.8	<MDL	22.8	1.0	<MDL	3.5	27.2
29	n/a	779.8	<MDL	26.3	1.0	<MDL	4.7	32.0
29	n/a	779.8	<MDL	16.9	0.5	<MDL	3.1	20.5
29	n/a	779.8	<MDL	21.4	0.6	<MDL	3.4	25.4
29 AVR	n/a	779.8	<MDL	21.6	0.7	<MDL	3.7	26.0
63	n/a	779.8	<MDL	6.1	0.2	<MDL	2.6	8.9
63	n/a	779.8	<MDL	10.1	0.2	<MDL	3.5	13.9
63	n/a	779.8	<MDL	17.1	0.3	<MDL	2.6	20.0
63 AVR	n/a	779.8	<MDL	11.1	0.2	<MDL	2.9	14.3
122	n/a	779.8	<MDL	5.7	<MDL	<MDL	2.6	8.3
122	n/a	779.8	<MDL	6.9	<MDL	<MDL	1.7	8.6
122	n/a	779.8	<MDL	7.5	<MDL	<MDL	1.9	9.4
122 AVR	n/a	779.8	<MDL	6.7	<MDL	<MDL	2.0	8.8
239	n/a	779.8	<MDL	6.4	<MDL	<MDL	2.9	9.4
239	n/a	779.8	<MDL	7.5	<MDL	<MDL	2.7	10.2
239	n/a	779.8	<MDL	4.2	<MDL	<MDL	2.8	7.0
239 AVR	n/a	779.8	<MDL	6.0	<MDL	<MDL	2.8	8.9
307	n/a	779.8	<MDL	1.9	<MDL	<MDL	3.7	5.6
307	n/a	779.8	<MDL	1.8	<MDL	<MDL	4.0	5.8
307	n/a	779.8	<MDL	1.6	<MDL	<MDL	3.5	5.1
307 AVR	n/a	779.8	<MDL	1.7	<MDL	<MDL	3.7	5.5
427	n/a	779.8	<MDL	0.3	<MDL	<MDL	1.7	2.0
427	n/a	779.8	<MDL	<MDL	<MDL	<MDL	1.8	1.8
427	n/a	779.8	<MDL	<MDL	<MDL	<MDL	0.9	0.9
427 AVR	n/a	779.8	<MDL	0.2	<MDL	<MDL	1.4	1.6
553	n/a	779.8	<MDL	<MDL	<MDL	<MDL	1.0	1.1
553	n/a	779.8	<MDL	0.4	<MDL	<MDL	0.8	1.1
553	n/a	779.8	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
553 AVR	n/a	779.8	<MDL	0.2	<MDL	<MDL	0.7	0.9

Data obtained from Tables 8-12, pp. 36-45, and calculated from data obtained from p. 25-26 of the study report.

LOQ= 10 ppb; MDL= 2.0, 2.0, 1.2, 1.7, and 0.9 ppb for prothioconazole, -desthio, -S-methyl, -thiazocine, and 1,2,4-triazole, respectively.