

US EPA ARCHIVE DOCUMENT



- (2) No attempt was made to identify and quantify degradates.
- (3) Freezer storage stability data were not provided.
- (4) The study is incomplete because it was conducted at only one site instead of the minimum 2 sites required in the Subdivision N Guidelines.

The field terrestrial dissipation study must be repeated at at least 2 different representative sites and include freezer storage stability data. Attempts must be made to identify and quantify any degradates identified in the required repeat of the aerobic metabolism study (see review of Study 3, MRID #40607708).

Except for the possible minor contamination of 4 out of 59 samples collected at a depth greater than 10 cm, the sub 0-10 cm surface core part of the study is scientifically sound and provides supplemental information on the short term (eg., < 1 yr after application) leaching potential of cyproconazole. Based upon the results discussed below, cyproconazole did not appear to be very susceptible to leaching after being applied to turf once a month for 6 successive months at 131 g ai/acre/application (786 g or 1.73 lbs/acre total application). None of the samples collected at depths greater than 30 cm up to 4 months after the last application had detectable levels (0.01 ppm) of cyproconazole.

#### MATERIALS AND METHODS:

Cyproconazole (40% WG, source unspecified) was applied in six foliar applications at 131 g ai/acre/application (1.73 lbs/acre total application) to a turf-covered field plot (10 x 100 feet) located on fairways of a golf course in Watsonville, California. The soil was a sandy loam (52% sand, 43% silt, 5% clay, 1.2% organic matter, pH 7.4, CEC 20 meq/100 g). Applications were made at monthly intervals, beginning July 10, 1987. An untreated plot located 150 feet north of the treated plot served as the control. The fairways were fertilized, irrigated, and maintained as per typical practice for golf course fairways. Soil cores (3/sampling interval; 0- to 10-, 10- to 20-, and 20- to 30-cm depths) were taken on each application date and at various intervals up to 122 days following the last application. Additional cores (30- to 40-, 40- to 50-, and 50- to 60-cm depths) were taken 1-122 days following the last application. Samples were stored frozen at an unspecified temperature for 5-10 months prior to analysis.

Soil samples were analyzed according to analytical method number AM-0818. The soil samples were hydrolyzed with 1 N hydrochloric acid for 1 hour at 95 C, extracted with ethanol, and

filtered. The filtrate was concentrated by rotary evaporation, <sup>(1)</sup> N hydrochloric acid was added, and the extract was centrifuged. The extract was cleaned up with reverse phase HPLC and analyzed for cyproconazole using GC with phosphorus nitrogen detection. The detection limit was 0.01 ppm. Recovery efficiencies from soil samples fortified at 0.10 or 0.20 ppm ranged from 70 to 100% (Table 1).

#### SUMMARY OF DATA BY REVIEWER:

Cyproconazole (40% WG) was applied once a month at 131 g ai/acre/application for 6 consecutive months to a turf-covered field plot (sandy loam soil) located in Watsonville, California. Cyproconazole was 1.3 ppm immediately following the last of six treatments, decreased to 0.23 ppm at 56 days, then increased to 0.45 ppm at 84 days and 0.78 ppm at 122 days posttreatment in the 0- to 10- cm soil depth (Table 2). The registrant-calculated half-life was 42.5 days. In the 10- to 20- cm soil depth, cyproconazole was not detected (<0.01 ppm) at all sampling intervals up to 99 days following the last application, then increased to 0.019-0.021 ppm at 122 days posttreatment. Cyproconazole was <0.01 ppm in the 20- to 30-cm soil depth and <0.01 ppm in the 30- to 60-cm depths at sampling intervals up to 122 days following the last application. Rainfall was 6.01 inches and air and soil temperatures were 29-107 and 42-76 F, respectively, from July 7, 1987, through April 5, 1988.

#### DISCUSSION:

- (1) Three apparently anomalous increases in the concentration of cyproconazole occurred within surface soil core samples collected at times well after the last application to turf (Table 2). The anomalous results may be due to sample contamination and occur too frequently to accurately determine the cyproconazole dissipation rate.
- (2) No attempt was made to identify and quantify degradates.
- (3) Freezer storage stability data were not provided.
- (4) The study was conducted at only one test site. Terrestrial field dissipation studies must be conducted at a minimum of two test sites.
- (5) Field test data were incomplete; slope of the field and depth to the water table were not reported. Meteorological data were incomplete; precipitation and air and soil temperature data, provided through April 5, 1988, should have been reported through the last sampling date (April 22, 1988).

(6) Cyproconazole was not detected in soil samples collected at depths greater than 10 cm until 9 months after the first application and 4 months after the last application, and was not detected in any samples collected below 30 cm. Furthermore, the residues detected in samples collected from the 10 to 20 cm and 20 cm to 30 cm cores may have been due to contamination. Although the study indicates that cyproconazole is not readily susceptible to leaching, the possibility of leaching over longer time frames cannot be discounted due to the persistence of cyproconazole.

(7) The study authors stated that the detectable residues in the 10-20 cm and 20-30 cm soil depths (0.01-0.021 ppm) at 122 days following the last application were probably due to contamination of the soil samples, rather than to leaching. They concluded that the rate of leaching during the final month of the study would have had to be eight times as great as that during the first eight months of the study in order for residues to reach the 10- to 30- cm depth because residues were confined to the upper 10 cm of soil during the first eight months. Although the residues may be due to contamination, their reasoning is incorrect. During the first 8 months, residues could have migrated down to just above 10 cm depth and then migrated into the upper portions of the 10-20 cm core during the final month of the study. The residue in the samples from the 20-30 cm core are harder to explain and may be due to contamination.

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PERTINENT DATA TABLES AND/OR FIGURES

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Table I. Recoveries of Cyproconazole from Fortified Soil.

Sample (depth)	Fortification Level	Cyproconazole Recovery
121-CK (0-10 cm)	0.20	82.5%
121-CK (10-20 cm)	0.10	77%
121-CK (20-30 cm)	0.10	71%
122-CK (0-10 cm)	0.20	82.5%
122-CK (10-20 cm)	0.20	85%
122-CK (20-30 cm)	0.10	80%
123-CK (0-10 cm)	0.20	100%
123-CK (10-20 cm)	0.20	90%
123-CK (20-30 cm)	0.10	87.5%
124-CK (0-10 cm)	0.20	87.5%
124-CK (10-20 cm)	0.20	82.5%
124-CK (20-30 cm)	0.10	80%
125-CK (0-10 cm)	0.20	87.5%
125-CK (10-20 cm)	0.20	72.5%
125-CK (20-30 cm)	0.10	82.5%
126-CK (0-10 cm)	0.20	82.5%
126-CK (10-20 cm)	0.20	85%
127-CK (0-10 cm)	0.20	87.5%
127-CK (10-20 cm)	0.20	85%
127-CK (20-30 cm)	0.10	70%
109-CK (0-10 cm)	0.20	92.5%
113-CK (0-10 cm)	0.20	82.5%
117-CK (0-10 cm)	0.20	82.5%
128-CK (0-10 cm)	0.20	78%
130-CK (20-30 cm)	0.10	75%
121-CK (0-10 cm)	0.20	85%

Average (x) 82.8  
 Std. Deviation (s.d.): 6.6

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Table II. Cyproconazole Residue in Soil Resulting from a Representative Turf Application (ppm dry basis).

Sample	Interval (Days)	Cyproconazole Residue in PPM					
		Soil Depth in cm.					
		0-10	10-20	20-30	30-40	40-50	50-60
101-T	IP <sup>1</sup> 1st App.	0.12	ND <sup>2</sup>	ND	--	--	--
105-T	IP 2nd App.	0.10	ND	ND	--	--	--
109-T	IP 3rd App.	0.54	ND	ND	--	--	--
113-T	IP 4th App.	0.51	ND	ND	--	--	--
117-T	IP 5th App.	0.45	ND	ND	--	--	--
121-T	IP 6th App.	1.30 <sup>3</sup>	ND	ND	--	--	--
122-T	1	1.0	ND	ND	ND	ND	ND
123-T	14	0.64	ND	ND	ND	ND	ND
124-T	28	0.62	ND	ND	ND	ND	ND
125-T	42	0.55	ND	ND	ND	ND	ND
126-T	56	0.23	ND	ND	ND	ND	ND
127-T	70	0.35	ND	ND	ND	ND	ND
128-T	84	0.45	ND	ND	ND	ND	ND
129-T	99	0.14	ND	ND	ND	ND	ND
130-T	122	0.78	0.019	0.01	ND	ND	ND
130-T <sup>4</sup>	122	0.78	0.021	0.01	--	--	--

1/ = Immediate Post, collection of sample immediately after application (IP 6th App. is day zero immediately after the sixth application).

2/ ND = not detected (< 0.01 ppm)

3/ Average of three analysis (1.24, 1.22, and 1.43 ppm).

4/ Replicate analysis of day 122 samples