

US EPA ARCHIVE DOCUMENT

that did contain a discernible quantity (0.06 ppm) of trifluralin at the CA site.

For complete fulfillment of the terrestrial field dissipation data requirement, acceptable data must be submitted for two sites treated at the maximum registered application rate for each trifluralin formulation type.

Ancillary Study - Freezer Storage Stability

1. Freezer storage stability studies are not specifically required by Subdivision N guidelines.
2. Trifluralin did not degrade in acetonitrile:soil slurries that were stored frozen at 4 C for up to 454 days.
3. This study is scientifically sound. Based on the information provided by this study, trifluralin mixed with acetonitrile can be stored frozen for at least 454 days without degradation.
4. No additional data on the stability of trifluralin in acetonitrile:soil slurries during frozen storage are required at this time.

METHODOLOGY:

Field Dissipation - Terrestrial

Fresno, California: Bareground plots (40 x 40 feet) of loam soil (42% sand, 34% silt, 24% clay, 4.3% organic matter content, pH 6.7, CEC 11.0 meq/100 g) located in Fresno, California, were treated at 2.78 lb ai/A with trifluralin (Treflan EC, 44.1% EC, Eli Lilly and Company) on May 14, 1988, using a tractor-mounted spray boom. An untreated plot located 175 feet north of the treated plots served as a control. The plots were disked, then planted to cotton immediately following treatment. Each plot was subdivided into a 20 x 20 foot sampling area surrounded by a 20-foot buffer (Figures III and V). Soil samples were collected from the treated and control plots to a maximum depth of 36 inches. Soil cores from the 0- to 6-inch soil depth were collected using a 6-inch sampling tube. Soil cores from the 6- to 18-inch depth were collected using a zero contamination probe equipped with an acetate liner; the samples were divided into 6- to 12- and 12- to 18-inch segments. Soil cores from the 18- to 24- and 18- to 36-inch depths were also collected using a zero contamination probe; the samples were divided into 6-inch segments. Following each soil sampling, a sleeve was placed in the hole and the hole was vacuumed with a portable vacuum cleaner to remove any soil or debris that may have fallen in during soil sampling or insertion of the sleeve. Eight soil samples (0- to 18-inch depth) were collected from the treated and control plots prior to treatment, immediately posttreatment, and at 8, 34, 63, 94, 130, 205, 369, and 494 days posttreatment. Deeper soil samples (18- to 36-inch depth) were collected at 369 and 494 days posttreatment. Immediately after collection, each soil sample was transferred into a brown glass pint jar; acetonitrile:water (99:1, v:v) was added, and the jars were capped and shaken. The soil extracts were then shipped (5-8 days) to the analytical laboratory, where they were stored frozen at 4 C for up to 93 days prior to analysis.

Marion Junction, Alabama: Bareground plots (40 x 40 feet) of clay soil (16% sand, 38% silt, 46% clay, 2.4% organic matter content, pH 6.9, CEC 38.8 meq/100 g) located in Marion Junction, Alabama, were treated at 2.78 lb ai/A with trifluralin (Treflan 5, 50.7% EC, Eli Lilly and Company) on June 1, 1988, using a tractor-mounted spray boom. An untreated plot (40 x

40 feet) located 250 feet west of the treated plots served as a control. The plots were disked, then planted to soybeans immediately following treatment. The plots were subdivided and sampled as described for the Fresno site (Figures IV and V). Soil samples (8 samples/sampling interval) were collected from the treated and control plots prior to treatment, immediately posttreatment, and at 7, 14, 28, 63, 127, 198, 365, and 482 days posttreatment. Additional soil samples (18- to 36-inch depths) were collected at 198, 365, and 482 days posttreatment. The soil samples were extracted as described for the Fresno site, and the soil extracts were shipped (2-7 days) to the analytical laboratory, where they were stored frozen at 4 C for up to 447 days prior to analysis.

Analytical procedure: The soil samples were analyzed according to Dow-Elanco Method Number AM-AA-CA-R116-AA-755. The samples were extracted with acetonitrile:water (99:1, v:v) by shaking using a gyrating platform shaker for 15 minutes. An aliquot was diluted with deionized water until the acetonitrile concentration was 50%. The extract was filtered through a C18 column, and the eluate was analyzed by GC with electron capture detection. Recovery efficiencies from soil samples fortified with trifluralin at 0.1 ppm and analyzed concurrently with the field samples ranged from 77 to 104% (Table X). The method detection limit was 0.01 ppm.

Ancillary Study - Freezer Storage Stability

Loam and clay soils collected from the control plot at each test site were fortified in the field with trifluralin at 0.2, 1.0 or 2.0 ppm. Each fortified sample was transferred into a brown glass pint jar and mixed with acetonitrile:water (99:1, v:v). The jars were capped and shaken. The soil extracts were then shipped to the analytical laboratory, where the loam soil was stored frozen at 4 C for up to 100 days and the clay soil was stored frozen for up to 454 days. The soil extracts were analyzed for trifluralin using DowElanco Method Number AM-AA-CA-R116-AA-755 as described previously.

DATA SUMMARY:

Field Dissipation - Terrestrial

Trifluralin (Treflan, 44.1 or 50.7% EC), at 2.78 lb ai/A, dissipated with registrant-calculated half-lives of 149 days from loam soil planted to cotton in California and 93 days from clay soil planted to soybeans in Alabama. In general, trifluralin was not detected below the 0- to 6-inch soil depth. At both test sites, trifluralin was not detected in any of the pretreatment or control soil samples.

In Fresno, California, trifluralin dissipated with a registrant-calculated half-life of 149 days from the upper 6 inches of plots of loam soil that were treated with trifluralin (44.1% EC) in May 1988, disked, and planted to cotton immediately following treatment. In the 0- to 6-inch depth, trifluralin was 2.10-6.70 lb ai/A immediately posttreatment, 1.10-1.80 lb ai/A at 63 days, 0.30-1.90 lb ai/A at 130 days, 0.27-0.94 lb ai/A at 205 days, and 0.12-0.35 lb ai/A at 494 days posttreatment (Table XI). Trifluralin was not detected (<0.02 lb ai/A or 0.01 ppm) below 6 inches, except for one soil sample in the 24- to 30-inch depth that contained 0.06 lb ai/A at 494 days posttreatment. During the study, air temperatures ranged from 24 to 108 F, and soil temperatures (4-inch depth) ranged from 40 to 96 F. Cumulative precipitation plus irrigation totaled 37.74 inches. The slope of the field was near 0%, the depth to the water table was 40-50 feet, and no subsurface drainage was in place.

In Marion Junction, Alabama, trifluralin dissipated with a registrant-calculated half-life of 93 days from the upper 6 inches of plots of clay soil that were treated with trifluralin (50.7% EC) in June 1988, disked, and planted to soybeans immediately following treatment. In the 0- to 6-inch depth, trifluralin was 0.99-4.30 lb ai/A immediately posttreatment, 0.63-3.20 lb ai/A at 7 days, 0.56-4.20 lb ai/A at 63 days, 0.09-0.46 lb ai/A at 127 days, and ≤ 0.08 lb ai/A at 482 days posttreatment (Table XII). Trifluralin was not detected (< 0.02 lb ai/A or 0.01 ppm) below 6 inches. During the study, air temperatures ranged from 18 to 99 F and soil temperatures (4-inch depth) ranged from 42 to 99 F. Cumulative precipitation plus irrigation totaled 94.08 inches. The slope was 2-3%, the depth to the water table was < 6 feet, and no subsurface drainage was in place.

Ancillary Study - Freezer Storage Stability

Trifluralin was stable in an acetonitrile:soil mixture using loam and clay soils that were fortified in the field with trifluralin at 0.02, 1.0, or 2.0 ppm; immediately mixed with acetonitrile; and stored frozen at 4 C for 100 (loam) or 454 days (clay). Recoveries of trifluralin were 110-140% in the loam soil slurries after 100 days of storage and 95-105% (except for 1 of 15 samples at 85%) in the clay soil slurries after 454 days (Tables VIII and IX).

COMMENTS:

General

1. Degradates (a,a,a-trifluoro-2,6-dinitro-N-propyl-p-toluidine, a,a,a-trifluoro-5-nitro-4-propyl-toluene-3,4-diamine, 2-ethyl-7-nitro-1-propyl-5-(trifluoromethyl)benzimidazole-3-oxide, 2-ethyl-7-nitro-1-propyl-5-(trifluoromethyl)benzimidazole, 2-ethyl-7-nitro-5-(trifluoromethyl)benzimidazole; a,a,a-trifluoro-2,6-dinitro-p-cresol, and 2,2'-azoxybis(a,a,a-trifluoro-6-nitro-N-propyl-p-toluidine) were identified at maximum concentrations of 0.092-0.006 ppm (4.6%, 2.1%, 0.3%, 1.0%, 2.6%, 2.7% and 3.0%, respectively, of applied radioactivity) in aerobic metabolism study (MRID 41240501). Furthermore, the major degradates identified in anaerobic metabolism were a,a,a-trifluoro-5-nitro-N₄,N₄-dipropyl-toluene-3,4-diamine (which reached a maximum concentration of 5.4% (0.104 ppm) and 13.2% (0.264 ppm) of the applied radioactivity in the sandy loam soil and clay loam soil, respectively, at Day 60 postflooding, and 11.6% in the loam soil at Day 30 postflooding), 7-amino-2-ethyl-1-propyl-5-(trifluoromethyl)benzimidazole (which reached 7.3% in the sandy loam soil and 8.3% in the loam and clay loam soils at Day 60 postflooding), and a,a,a-trifluoro-N₄,N₄-dipropyltoluene-3,4,5-triamine (which reached 0.3% in the sandy loam soil, 4.1% in the loam soil, and 2.6% in the clay loam soil). Other degradates identified in the anaerobic metabolism study were a,a,a-trifluoro-2,6-dinitro-N-propyl-p-toluidine, a,a,a-trifluoro-5-nitro-N₄-propyl-toluene-3,4-diamine, 2-ethyl-7-nitro-1-propyl-5-(trifluoromethyl)benzimidazole, and 2,2'-azoxybis(a,a,a-trifluoro-6-nitro-N-propyl-p-toluidine), which were each present at concentrations $\leq 2.1\%$ (0.042 ppm) of the initial radioactivity. Degradates, 2-ethyl-7-nitro-1-propyl-5-(trifluoromethyl)benzimidazole-3-oxide and 7-amino-2-ethyl-5-(trifluoromethyl)benzimidazole, were each present at $\leq 1.0\%$ of the initial radioactivity.
2. The application rate of 2.78 lb ai/A was reported to be 1.4 times the maximum use rate on cotton or soybeans.
3. EFGWB prefers that residues in samples be separated by chromatographic methods (such as TLC, HPLC, and GC) solvent systems of diffe-

rent polarity, and that specific compounds isolated by chromatography be identified using a confirmatory method such as MS in addition to comparison to the R_f of reference standards.

In this study aliquots of the extracts were analyzed by GC.

Fresno site

1. The study author suggested that the presence of residues in one soil sample from the 24- to 30-inch depth was possibly due to field or laboratory contamination since no measurable residue of trifluralin was found in any sample below the 6-inch depth.
2. At the test site, no pesticides were applied for the three years preceding the study. Established alfalfa was present during 1985-86. The field was plowed and left as bareground in 1987.

Marion Junction site

1. The meteorological data were incomplete; soil temperature data were not provided for December 1988 and January 1989.
2. At the test site, atrazine was applied to corn at 2.5 lb ai/A in 1985 and 1987, and trifluralin was applied to soybeans at 1.0 lb ai/A in 1986.

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