DATA EVALUATION RECORD

STUDY 5

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STUDY ID 42245130
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CONCLUSIONS

Degradation - Photodegradation on Soil

1. Both the natural and artificial sunlight studies are not scientifically valid and do not provide useful information on the photodegradation of difenoconazole on sandy loam soil. The experimental methods, specifically the sample preparation, soil moisture content, and incubation conditions, were not valid for the determination of photodegradation of the parent compound on soil. Also, in the artificial sunlight study, replicate samples were not used. As a result of these methods, the registrant calculated half-lives for the natural and artificial sunlight studies do not agree, nor do they agree with the photolytic half-lives determined in an additional submitted soil photolysis study (MRID 42245129). Additionally, the registrant-calculated half-life (natural sunlight study only) was extrapolated beyond the scope of the observed data.

2. Both studies do not meet Subdivision N Guidelines for the fulfillment of EPA data requirements on photodegradation on soil for the following reasons:

   (i) the soil was too finely sieved (0.25 mm);

   (ii) soil moisture content was not adjusted to or maintained at 75% of 0.33 bar;

   (iii) soil viability was not assured;

   (iv) the incubation temperature was not held constant; and

   (v) material balances were >110% (artificial light study only).

3. In the natural light study, triazole ring-labeled [3,5-$^{14}$C]difenoconazole, at a nominal application rate of 10 ppm, degraded with a registrant-calculated half-life of 39.4 days ($r^2$ = 0.88) in sandy loam soil maintained at 19-48 °C and irradiated with natural sunlight for up to 30 days. However, the half-life was determined beyond the scope of the observed data; the parent was 51.9% of the applied radioactivity at 360 hours posttreatment. In contrast, the parent was relatively stable in the dark control samples. All data, designated as percentages of the applied radioactivity, represent percentages of the nominal application. Data are the reviewer-calculated mean of two replicates, except where only single replicate data were provided (time 0 and dark control samples). Data were determined using one TLC solvent system unless otherwise indicated. In the irradiated soil, the parent compound was initially 93.9% (single replicate) of the applied radioactivity, decreased to 72.6% by 4 days, was 60.1% at 18 days, and was 51.9% at 30 days posttreatment (two TLC systems). The minor degradate CGA-190978 was initially (time 0) 0.11% (single replicate) of the applied radioactivity, was a maximum of 6.2% at 23 days, and was 3.4% at 30 days posttreatment. The minor degradate CGA-205375 was

initially (time 0) 3.5% (single replicate) of the applied radioactivity, was a maximum of 6.4% at 18 days, and was 4.0% at 30 days posttreatment. The minor degradate CGA-131013 was initially (day 4) 2.2% of the applied radioactivity, was a maximum of 4.8% at 18 days, and was 2.8% at 30 days posttreatment. The minor degradate CGA-205374 was initially (day 4) 5.3% of the applied radioactivity and was variable at 3.6-4.9% at 8-30 days posttreatment. The minor degradate CGA-189138 was variable at 2.2-2.8% of the applied radioactivity at 4-30 days posttreatment, except was a maximum of 4.9% at 14 days. Nonextractable [$^{14}$C]residues were not determined; [$^{14}$C]volatiles were not collected.

In the dark control soil (natural sunlight study), the parent compound was initially 95.7% of the applied radioactivity and was variable at 84.6-98.7% at 4-30 days posttreatment. The minor degradate CGA-190978 was initially (time 0) 0.11% of the applied radioactivity and was variable at 0.24-1.1% at 4-30 days posttreatment, except for a maximum of 4.6% at 23 days. The minor degradate CGA-205375 was initially (time 0) 3.5% of the applied radioactivity and was variable at 0.67-3.4% at 4-30 days posttreatment. The minor degradate CGA-131013 was detected twice, at 0.14% of the applied radioactivity at 14 days and 0.47% at 30 days posttreatment. The minor degradate CGA-205374 was initially (day 8) 0.33% of the applied radioactivity and increased with variability to a maximum of 1.9% by 30 days posttreatment. The minor degradate CGA-189138 was initially (day 4) 2.2% of the applied radioactivity and was variable at 1.7-3.1% at 8-30 days, except was a maximum of 6.3% at 18 days posttreatment. Nonextractable [$^{14}$C]residues and [$^{14}$C]volatiles were not measured.

In the artificial sunlight study, triazole ring-labeled [3,5-$^{14}$C]difenoconazole, at a nominal application rate of 10 ppm, degraded with a registrant-calculated half-life of 350 hours ($r^2$ = 0.90) in sandy loam soil maintained at 27-35 °C and continuously irradiated with artificial sunlight for up to 360 hours; the half-life is equivalent to 29.1 days of natural sunlight. However, the registrant-calculated half-life is of questionable accuracy because the half-lives obtained from the natural and artificial light studies do not agree. In contrast, the parent was relatively stable in the dark control samples. All data, designated as percentages of the applied radioactivity, represent percentages of the nominal application. Data are the reviewer-calculated mean of two replicates, except where only single replicate data were provided (time 0 and dark control samples). Data were determined using two TLC solvent systems unless otherwise indicated. In the irradiated soil, the parent compound was initially 93.9% (single replicate) of the applied radioactivity, decreased to 74.9% by 48 hours, was 50.2% at 240 hours, and was 44.6% at 360 hours posttreatment. The major degradate CGA-205375 was initially (hour 48) 3.4% of the applied radioactivity, was a maximum of 9.9% at 168 hours, and was 8.2% at 360 hours posttreatment (one TLC system). The major degradate CGA-131013 was initially (hour 48) 4.0% (one TLC system) of the applied radioactivity and was a maximum of 9.8% at 360 hours posttreatment. The minor degradate CGA-190978 was initially (time 0) 0.60% (single replicate) of the applied radioactivity, was a maximum of 8.1% at 168

hours, and was 6.2% at 360 hours posttreatment. The minor degradate CGA-205374 was initially (time 0) 1.3% (single replicate; one TLC system) of the applied radioactivity, was a maximum of 7.7% at 240 hours, and was 7.0% at 360 hours posttreatment. The minor degradate CGA-189138 was initially (time 0) present at 2.8% (single replicate; one TLC system) of the applied radioactivity, increased with variability to a maximum of 4.5% by 168 hours, and was 3.9% at 360 hours posttreatment. Nonextractable uncharacterized [$^{14}$C]residues accounted for ≤2.7% (single replicate) of the applied radioactivity during the study period. [$^{14}$C]Volatiles were not collected.

In the dark control soil (artificial sunlight study), the parent compound was initially 93.9% of the applied radioactivity and was variable at 81.5-99.7% at 48-360 hours posttreatment. The minor degradate CGA-190978 was initially (time 0) present at 0.60% of the applied radioactivity and was variable at 1.0-2.0% at 48-360 hours posttreatment. The minor degradate CGA-205375 was initially (hour 48) 2.6% of the applied radioactivity, was a maximum of 3.1% at 96 hours, and decreased with variability to 2.8% by 360 hours posttreatment (one TLC system). The minor degradate CGA-131013 was initially (hour 96) 0.14% (one TLC system) of the applied radioactivity and was a maximum of 0.77% (one TLC system) at 360 hours posttreatment. The minor degradate CGA-205374 was initially (time 0) 1.3% (one TLC system) of the applied radioactivity, was a maximum of 2.7% (one TLC system) at 96 hours, and decreased with variability to 2.3% by 360 hours posttreatment. The minor degradate CGA-189138 was initially (time 0) 2.8% (one TLC system) of the applied radioactivity and increased with variability a maximum of 3.0% by 360 hours posttreatment. Nonextractable [$^{14}$C]residues were not determined for the dark control samples; [$^{14}$C]volatiles were not collected.

## METHODOLOGY

The photolysis of triazole ring-labeled [3,5-$^{14}$C]difenoconazole {CGA-169374; 1-[[2-[2-chloro-4-(4-chlorophenoxy)phenyl]-4-methyl-1,3-dioxolan-2-yl]methyl]-1H-1,2,4-triazole; radiochemical purity 95.1%, specific activity 22.2 $\mu$Ci/mg; p. 9; Figure 1, p. 37} on soil was examined under natural sunlight and under artificial light conditions.

Samples (2.0 g) of sieved (60 mesh; see comment #4), air-dried sandy loam soil (from Kerman, CA; 67% sand, 27% silt, 6% clay, 1.0% organic matter, pH 8.5, CEC 10.4 meq/100 g; p. 10) were moistened with 2 mL deionized water in Pyrex glass Petri dishes and spread evenly on the inside bottom (p. 11). The soil:water slurry (1:1, w:v) was oven dried overnight at 35 ± 1 °C. Soil samples were treated with triazole ring-labeled [3,5-$^{14}$C]difenoconazole, dissolved in acetonitrile, at a nominal application rate of 10 ppm (p. 12); the solvent was evaporated at room temperature. Sample dishes were covered with polyethylene film (0.5-mm thick; p. 10) and irradiated with natural sunlight in August (Frederick, MD; 39° N latitude and 77° W longitude) for up to 30 days (p. 13; Figure 2, p. 38; see Comment #10). Total light intensity of natural sunlight was measured using two

light meters (data reported in Table IV, pp. 24-25). The temperature of the sample dishes was not controlled; ambient temperatures varied between 19 °C and 48 °C during the study period. Dark control samples were prepared using the same method, except samples were covered with aluminum foil (p. 12). Volatiles were not measured. Duplicate irradiated and single dark control samples were removed for analysis at 0, 4, 8, 14, 18, 23, and 30 days posttreatment (p. 13).

For the artificial light study, samples were prepared as previously described, except the soil:water slurries were spread at a thickness of 250 $\mu$m on glass plates using a TLC spreader (p. 12); samples were air dried overnight. Soil samples were divided into 1 x 2 cm sections, treated, and incubated in an air-cooled photolysis chamber (Figure 3, p. 39); the temperature was 27-35 °C at the soil surface during the incubation period (Table III, p. 23). Samples were continuously irradiated for up to 360 hours using a mercury arc lamp equipped with a Pyrex glass filter (6 mm) to remove wavelengths of <290 nm (pp. 11, 12). The light intensity of the mercury arc lamp, measured using a light meter (290-1400 nm), was 2.0-4.2 x $10^{-5}$ W/cm$^2$ (p. 12, Table III, p. 23; see Comment #14). A comparison graph of artificial light *vs.* global irradiance was presented in Figure 4 (p. 40). Natural sunlight on a clear sunny day was approximately 2.0-2.6 x $10^{-5}$ W/cm$^2$ (measured in August in Frederick, MD; 39° N latitude and 77° W longitude; p. 12); one 12-hour period of artificial light was equivalent to one day of natural sunlight (p. 13). Dark control samples were prepared using the same method, except samples were covered with aluminum foil (p. 12). Volatiles were not measured. A single irradiated and dark control soil sample was removed for analysis at 0, 48, 96, 168, 240, and 360 hours posttreatment (p. 13; see Comment #3).

At each sampling interval (both studies), samples were scraped into glass vials and extracted by sonicating with methanol:water (8:2; v:v; p. 13). Aliquots of the extracts were analyzed for total radioactivity by LSC. Aliquots of the extracts were also were analyzed by one-dimensional TLC on two silica gel plates, each developed with acetonitrile (twice) OR chloroform:methanol (9:1, v:v). Samples were co-chromatographed with nonradiolabeled reference standards of the parent and potential degradates (degradates not specified; p. 17; see Comment #12), which were visualized with UV (254 nm) light. Areas of radioactivity on the plates were quantified using radioimage scanning. Selected soil samples (days 8-30, natural sunlight study) were further extracted by refluxing with methanol:water (9:1, v:v; p. 13). Selected soil samples (hours 96-360, artificial light study) were further extracted by refluxing with methanol:water (9:1, v:v; pH not specified), followed by methanol:water (9:1, v:v; pH 5), followed by 0.1 M oxalic acid in dimethylformamide:water (1:1, v:v). Aliquots of each extract were analyzed by LSC and by the two TLC systems as described previously (Tables V, VI, X, XI, XII, pp. 26, 27, 31-33).

To confirm the identity of the parent compound, aliquots of the sonicated extracts from selected samples (day 30, natural sunlight study; hour 360, artificial light study) were

analyzed by two-dimensional TLC on silica gel plates developed with chloroform:methanol (9:1, v:v) followed by chloroform:methanol:formic acid:water (75:20:4:2, v:v:v:v; p. 14). Areas of radioactivity were located using X-ray film imaging. Areas of radioactivity were scraped from the plates and analyzed by LSC.

Post-extracted soil samples were analyzed for total radioactivity by LSC following combustion (artificial light study only; pp. 14, 15).

## DATA SUMMARY

### Natural Sunlight

Triazole ring-labeled [3,5-$^{14}$C]difenoconazole (radiochemical purity 95.1%), at a nominal application rate of 10 ppm, degraded with a registrant-calculated half-life of 39.4 days ($r^2$ = 0.88) in sandy loam soil maintained at 19-48 °C and irradiated with natural sunlight for up to 30 days (Table VIII, p. 29). However, the half-life was determined beyond the scope of the observed data (see Comment #2); the parent was 51.9% of the applied radioactivity at 360 hours posttreatment (Table VIII, p. 29). In contrast, the parent was relatively stable in the dark control samples (one solvent system; Table VI, p. 27; see Comment #9). All data, designated as percentages of the applied radioactivity, represent percentages of the nominal application. Data are the reviewer-calculated mean of two replicates, except where only single replicate data were provided (time 0 and dark control samples). Data were determined using one TLC solvent system unless otherwise indicated (see Comment #9). In the irradiated soil, the parent compound was initially present at 93.9% (single replicate) of the applied radioactivity, decreased to 72.6% of the applied by 4 days posttreatment, was 60.1% of the applied at 18 days posttreatment, and was 51.9% of the applied at 30 days posttreatment (two TLC systems; Table VIII, p. 29). The minor degradate CGA-190978 (designated "reg 1") was initially (time 0) present at 0.11% (single replicate) of the applied radioactivity, was a maximum of 6.2% of the applied at 23 days posttreatment, and was 3.4% of the applied at 30 days posttreatment (Table VI, p. 27). The minor degradate CGA-205375 (designated "reg 2") was initially (time 0) present at 3.5% (single replicate) of the applied radioactivity, was a maximum of 6.4% of the applied at 18 days posttreatment, and was 4.0% of the applied at 30 days posttreatment. The minor degradate CGA-131013 (designated "reg 3") was initially (day 4) present at 2.2% of the applied radioactivity, was a maximum of 4.8% of the applied at 18 days posttreatment, and was 2.8% of the applied at 30 days posttreatment. The minor degradate CGA-205374 (designated "reg 4") was initially (day 4) present at 5.3% of the applied radioactivity and was variable at 3.6-4.9% of the applied at 8-30 days posttreatment. The minor degradate CGA-189138 (designated "remain") was variable at 2.2-2.8% of the applied radioactivity at 4-30 days posttreatment, except was a maximum of 4.9% of the applied at 14 days posttreatment. Uncharacterized origin material initially (day 4) accounted for 5.2% of the applied radioactivity and generally increased to a

maximum of 23.9% of the applied by 30 days posttreatment. Nonextractable [$^{14}$C]residues were not determined; [$^{14}$C]volatiles were not collected.

In the dark control soil, the parent compound was initially present at 95.7% of the applied radioactivity and was variable at 84.6-98.7% of the applied at 4-30 days posttreatment (Table VI, p. 27). The minor degradate CGA-190978 (designated "reg 1") was initially (time 0) present at 0.11% of the applied radioactivity and was variable at 0.24-1.1% of the applied at 4-30 days posttreatment, except for a maximum of 4.6% of the applied at 23 days posttreatment. The minor degradate CGA-205375 (designated "reg 2") was initially (time 0) present at 3.5% of the applied radioactivity and was variable at 0.67-3.4% of the applied at 4-30 days posttreatment. The minor degradate CGA-131013 (designated "reg 3") was detected twice, at 0.14% of the applied radioactivity at 14 days posttreatment and 0.47% of the applied at 30 days posttreatment. The minor degradate CGA-205374 (designated "reg 4") was initially (day 8) present at 0.33% of the applied radioactivity and increased with variability to a maximum of 1.9% of the applied by 30 days posttreatment. The minor degradate CGA-189138 (designated "remain") was initially (day 4) present at 2.2% of the applied radioactivity and was variable at 1.7-3.1% of the applied, except for a maximum of 6.3% of the applied at 18 days posttreatment. Uncharacterized origin material initially (day 4) accounted for 0.14% of the applied radioactivity and was a maximum of 2.8% of the applied by 30 days posttreatment. Nonextractable [$^{14}$C]residues and [$^{14}$C]volatiles were not measured.

The material balances (based on LSC analysis of individual replicates) for the irradiated soil were 87.2-104.9% of the applied radioactivity, with no clear pattern of decline (Table V, p. 26). In the dark control soil, material balances were 93.9-106.9% of the applied radioactivity, with no clear pattern of decline.

Artificial Sunlight

Triazole ring-labeled [3,5-$^{14}$C]difenoconazole (radiochemical purity 95.1%), at a nominal application rate of 10 ppm, degraded with a registrant-calculated half-life of 350 hours ($r^2$ = 0.90) in sandy loam soil maintained at 27-35 °C and continuously irradiated with artificial sunlight for up to 360 hours (Table XIII, p. 34); the half-life is equivalent to 29.1 days of natural sunlight. However, the registrant-calculated half-life is of questionable accuracy because the half-lives obtained from the natural and artificial light studies do not agree (see Comment #1). In contrast, the parent was relatively stable in the dark control samples (Tables XI, XII, pp. 32-33). All data, designated as percentages of the applied radioactivity, represent percentages of the nominal application. Data are the reviewer-calculated mean of two replicates, except where only single replicate data were provided (time 0 and dark control samples). Data were determined using two TLC solvent systems unless otherwise indicated (see Comment #9). In the irradiated soil, the parent compound was initially present at 93.9% (single replicate) of the applied radioactivity, decreased to 74.9% of the applied by 48 hours posttreatment, was 50.2% of the applied at 240 hours

posttreatment, and was 44.6% of the applied at 360 hours posttreatment (Table XIII, p. 34). The major degradate

CGA-205375 (designated "reg 2")

was initially (hour 48) present at 3.4% of the applied radioactivity, was a maximum of 9.9% of the applied at 168 hours posttreatment, and was 8.2% of the applied at 360 hours posttreatment (one TLC system; Tables XI, pp. 32). The major degradate

CGA-131013 (designated "reg 4", Table XI, p. 32; "reg 3", Table XII, p. 33)

was initially (hour 48) present at 4.0% (one TLC system) of the applied radioactivity and was a maximum of 9.8% of the applied at 360 hours posttreatment (Tables XI, XII; pp. 32, 33). The minor degradate CGA-190978 (designated "reg 1") was initially (time 0) present at 0.60% (single replicate) of the applied radioactivity, was a maximum of 8.1% of the applied at 168 hours posttreatment, and was 6.2% of the applied at 360 hours posttreatment. The minor degradate CGA-205374 (designated "reg 5", Table XI, p. 32; "reg 4", Table XII, p. 33) was initially (time 0) present at 1.3% (single replicate; one TLC system) of the applied radioactivity, was a maximum of 7.7% of the applied at 240 hours posttreatment, and was 7.0% of the applied at 360 hours posttreatment. The minor degradate CGA-189138 (designated "remain") was initially (time 0) present at 2.8% (single replicate; one TLC system) of the applied radioactivity, increased with variability to a maximum of 4.5% of the applied by 168 hours posttreatment, and was 3.9% of the applied at 360 hours posttreatment. An unidentified minor degradate (designated "reg 3", Table XI, p. 32; "reg 2", Table XII, p. 33) initially (time 0) accounted for 2.2% of the applied radioactivity, was maximum of 8.1% of the applied at 240 hours posttreatment, and was 6.8% of the applied at 360 hours posttreatment. Uncharacterized origin material initially (time 0) accounted for 1.3% (single replicate; one TLC system) of the applied radioactivity and was 13.1-15.1% of the applied radioactivity at 96-360 hours posttreatment. Nonextractable [$^{14}$C]residues accounted for $\leq$2.7% (single replicate) of the applied radioactivity during the study period (Table X, p. 31). [$^{14}$C]Volatiles were not collected.

In the dark control soil, the parent compound was initially present at 93.9% of the applied radioactivity and was variable at 81.5-99.7% of the applied at 48-360 hours posttreatment (Tables XI, XII, pp. 32, 33). The minor degradate CGA-190978 (designated "reg 1") was initially (time 0) present at 0.60% of the applied radioactivity and was variable at 1.0-2.0% of the applied at 48-360 hours posttreatment. The minor degradate CGA-205375 (designated "reg 2") was initially (hour 48) present at 2.6% of the applied radioactivity, was a maximum of 3.1% of the applied at 96 hours posttreatment, and decreased with variability to 2.8% of the applied by 360 hours posttreatment (one TLC system; Table XI, p.32). The minor degradate CGA-131013 (designated "reg 4", Table XI, p. 32; "reg 3", Table XII, p. 33) was initially present at 0.14% (one TLC system) of the applied

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radioactivity at 96 hours posttreatment and was a maximum of 0.77% (one TLC system) of the applied at 360 hours posttreatment. The minor degradate CGA-205374 (designated "reg 5", Table XI, p. 32; "reg 4", Table XII, p. 33) was initially (time 0) present at 1.3% (one TLC system) of the applied radioactivity, was a maximum of 2.7% (one TLC system) of the applied at 96 hours posttreatment, and decreased with variability to 2.3% of the applied by 360 hours posttreatment. The minor degradate CGA-189138 (designated "remain") was initially (time 0) present at 2.8% (one TLC system) of the applied radioactivity and increased with variability to a maximum of 3.0% of the applied by 360 hours posttreatment. An unidentified minor degradate (designated "reg 3", Table XI, p. 32; "reg 2", Table XII, p. 33) was variable at 1.2-2.5% (single replicate) at 0-360 hours posttreatment. Uncharacterized origin material initially (time 0) was variable at 1.1-2.7% of the applied radioactivity at 0-30 hours posttreatment. Nonextractable [$^{14}$C]residues were not determined for the dark control samples; [$^{14}$C]volatiles were not collected.

The material balances (based on LSC analysis of individual replicates) for the irradiated soil were 93.8-123.5% of the applied radioactivity, with no clear pattern of decline (Table X, p. 31; see Comment #7). In the dark control soil, material balances were 91.3-107.3% of the applied radioactivity, with no clear pattern of decline.

COMMENTS

1. The registrant-calculated half-lives are of questionable accuracy because the half-lives for the natural and artificial light studies are not similar. The registrant calculated half-life was 39.4 days in the natural sunlight system (Table VIII, p. 29), but was the equivalent of 29.1 days in the artificial sunlight system (Table XIII, p. 34). The registrant did not discuss the difference in results. Also, the registrant-calculated half-lives reported in this MRID are not similar to the half-lives reported in an additional submitted soil photolysis study of phenyl ring-labeled difenoconazole (MRID 42245129). Both studies used similar test conditions, but in the additional study, the registrant calculated half-lives were 69.8 days in the natural sunlight system and 23.7 in the artificial sunlight system (Tables VIII, XIII; p. 29, 34). Of the four half-lives reported, the two half-lives for the artificial light studies were the most similar; however, it is unclear which of the half-lives determined are more accurate. Moreover, problems with experimental methods precluded the determination of accurate half-lives (see Comments #4-6) .

2. In the natural sunlight study, the registrant calculated half-life is of questionable validity because data were extrapolated beyond the scope of the observed data; the parent compound was 51.9% of the applied at 30 days posttreatment (Table VIII, p. 29). Data which appear linear may become curvilinear over time, and a half-life estimated using such data may be inaccurate.

3. In the artificial light study, replicate samples were not utilized. The study author reported that "a single series of soil films was exposed in the artificial light study" (p. 13). The study protocol states that only one plate (containing two "spots") was removed for analysis at each sampling interval (Appendix A, p. 55). Duplicate results data were provided in the data tables. The use of a single sample is generally not considered to be scientifically sound laboratory practice; at a minimum, duplicate samples should be used.

4. In both studies, the soil was too finely sieved (60 mesh, 0.25 mm; p. 11), so that a significant portion of the sand fraction may have been removed. Removing the sand fraction results in chemical and physical changes, possibly resulting in a different half-life than would occur in soil sieved at 2 mm (as required by Subdivision N Guidelines). Additionally, removing a portion of the sand fraction changes the effective textural class of the soil samples used in the study.

5. In both studies, the moisture content of the soil samples was adjusted to or maintained at 75% of 0.33 bar. Thin layers of soil (0.25 mm thick, artificial light; thickness not reported, natural light study) were prepared and oven (natural light) or air (artificial light) dried prior to treatment and incubation (pp. 11, 12). The addition of water to the soils after the initial drying was not reported. The observed variability over time and the inconsistence in data between labels may have been a result of different moisture levels (and viability) in the soil samples. The reviewer notes that the viability of the soil samples was not assured, and the microbial populations were not enumerated in the test soils at the initiation or completion of the incubation. Subdivision N Guidelines require that the soil moisture content be maintained at 74% of 0.33 bar and that the soil viability be confirmed.

6. In both studies, the experimental temperature was not held constant at 18-30 ± 1 °C, as required by Subdivision N Guidelines. The natural sunlight and artificial light studies were conducted at 19-48 °C and 27-35 °C, respectively (Tables III, IV, pp. 23-25).

7. In the artificial light study, the material balances were >110% in four of the 11 samples analyzed (Table X, p. 31). In those samples, the material balances were 114.4-123.5% of the applied radioactivity. Subdivision N Guidelines require that the material balances be 90-110% of the applied radioactivity. Additionally, the reviewer noted that material balances were not >110% in the artificial light study dark control samples or the natural light study samples; however, nonextractable [$^{14}$C]residues were not analyzed in these samples, but were analyzed in the samples which exceeded 110% material balance.

8. The limits of detection and quantitation were not reported for LSC or TLC analyses. Both limits of detection and quantitation should be reported to allow the reviewer to assess the adequacy of the methods for the determination of the test compound and its degradates.

9. In the natural sunlight study, data for the TLC chloroform:methanol solvent system analyses were missing from the MRID for both irradiated and dark control samples (Table VII, p. 28). This problem may have been caused by a photocopier malfunction prior to review. As a result, data reported for the natural sunlight system were analyzed by only one of the two TLC analyses reported in the methodology (acetonitrile; Table VI, p. 27), except for the parent data, which were reported for both TLC analyses in Table VIII (p. 29). All data in the artificial sunlight study were analyzed by both TLC analyses (Tables XI, XII, pp. 32, 33); however, some residues were only observed one of the two analyses.

10. In the natural sunlight study, the study author stated that samples were irradiated at a 90° angle to the sun (p. 13); however, samples in the diagram were held at a 45° angle to the ground (Figure 2, p. 38). Clarification by the registrant may be necessary.

11. The study author stated that the "full spectrum" of natural sunlight was measured for samples exposed to natural sunlight (Table IV, pp. 24, 25). The reviewer was unable to confirm which wavelengths were measured. Additionally, the average duration of direct sunlight was not reported.

12. The study author did not specify which reference standards of the potential degradates were co-chromatographed with the samples. The study author reported eight potential degradates: CGA-142856, CGA-143548, CGA-131013, CGA-205374, CGA-71019, CGA-205375, CGA-189138, and CGA-190978 (Table IX, p. 30); however, the chemical structure was provided for only five of the compounds (Figure 1, p. 37). Additionally, the chemical names of the potential degradates were not reported. In future studies submitted to the EPA, all chemical names and structures should be reported.

13. The same soil was used in the aerobic soil metabolism study (MRID 42245133). The soil series name for the sandy loam soil was not reported in this soil photolysis study, but was reported in the soil metabolism study as the Hesperia series.

14. The light intensity data reported in this DER are from page 12; however, the reviewer noted that the same data was reported in different orders of magnitude when reported in the data tables (Tables III, IV; pp. 23-25). Clarification by the registrant as to the correct values may be necessary.

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EFED Review for MRID # 422451-30

Page____ is not included in this copy.

Pages 12 through 43 are not included.

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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.

X FIFRA registration data.

____ The document is a duplicate of page(s) _____.

____ The document is not responsive to the request.

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The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

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