

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD

STUDY 2

CHEM 06160?

Paraquat

\$164-1

FORMULATION--15--SOLUBLE CONCENTRATE (SC/L)

STUDY ID 41352112

Anderson, L., G. Emburey, R. Hoag, B. Riggle, and M. Earl. 1989. Paraquat: Short-term field soil dissipation under in-use conditions in the USA (Clermont, Florida) during 1987-1989. Laboratory Project ID PP148BD04. Performed by ICI Agrochemicals, Berkshire, UK, and submitted by ICI Americas Inc., Wilmington, DE.

DIRECT REVIEW TIME - 4

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CONCLUSIONS:Field Dissipation - Terrestrial

1. This study can be used to fulfill data requirements.
2. Paraquat did not significantly dissipate from sand soil field plots in Florida during a 21-month study. The test substance remained in the 0- to 3.5-inch soil depth and did not leach into lower soil horizons (4.5- to 10.0-, 10.0- to 15.5-, and 15.5- to 33.5-inch depths).
3. This study is acceptable and fulfills EPA Data Requirements for Registering Pesticides by providing information on the terrestrial field dissipation of the SC/L formulation of paraquat (Gramoxone Super) at one site.

4. Additional studies of the long-term terrestrial field dissipation of paraquat are required.

METHODOLOGY:

Paraquat (Gramoxone, Super, 1.5 lb/gallon SC/L) was applied at 4.7 lb ai/A as a preemergence spray to three plots (18 x 70 feet) of sand soil (94-96% sand, 1-4% silt, 2-3% clay, 1.1-2.0% organic matter, pH 5.9-7.0, CEC 3.0-5.1 meq/100 g) located in Clermont, Florida, on August 26, 1987. An untreated plot (18 x 70 feet) was maintained as a control. The plots were rototilled to a depth of 8 inches 1 day prior to treatment and planted to tomatoes 2 days after treatment. Soil cores (2-inch diameter, 0- to 3.5-inch depth; 1-inch diameter, 3.5-15.5- and 15.5- to 33.5-inch depths) were collected prior to treatment, immediately posttreatment, and at 33, 89, 194, 359, and 644 days posttreatment. The cores were stored frozen at <-18 C for up to 22 months prior to extraction and analysis.

Prior to extraction, the immediate posttreatment 0- to 3.5-inch soil cores were divided into 0- to 2- and 2- to 3.5-inch segments; at all other sampling intervals, the 0- to 3.5-inch cores were left intact. The 3.5- to 15.5-inch cores were divided into 4.5- to 10.0- and 10.0- to 15.5-inch segments after discarding the top 1 inch of each core. The 15.0- to 33.5-inch cores were left intact. For each sampling interval, soil cores taken from the same plot and depth were combined, mixed, and subsampled. Soil subsamples were refluxed with 6 M sulfuric acid for 5 hours. The extract was filtered and applied to a cation exchange resin column. Paraquat was eluted from the column with saturated ammonium chloride solution and reduced to a free radical with sodium dithionite in alkali. The concentration of paraquat was then determined using spectrophotometry. The detection limit was 0.05 ppm. The recovery efficiency from sand soil fortified with paraquat (concentration unspecified) averaged 93%.

DATA SUMMARY:

Paraquat (Gramoxone Super, 1.5 lb/gallon SC/L), at 4.7 lb ai/A, dissipated with a half-life of >21 months in the 0- to 3.5-inch depth of field plots of sand soil located in Florida that were treated on August 26, 1987. Paraquat was detected at 3.4-3.6 ppm in the 0- to 3.5-inch soil depth immediately posttreatment, then remained relatively stable from 33 to 644 days posttreatment with average concentrations of 2.7-2.9 ppm (range 1.4-4.3 ppm) (Table III). Paraquat was detected in the 4.5- to 10.0-inch soil depth only immediately posttreatment at 0.07 ppm, indicating possible contamination during the sampling procedure; it was not detected (<0.05 ppm) at lower depths (10.0- to 15.5- and 15.5- to 33.5-inch depths) at any sampling interval.

During the study, rainfall plus irrigation totaled 99.1 inches, air temperatures ranged from -29 to 98 F, and soil temperatures (2-inch depth) ranged from 40 to 99 F.

COMMENTS:

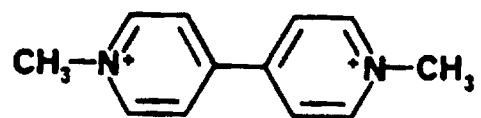
1. Soil samples were stored frozen for up to 22 months prior to extraction, but storage stability data were not provided for review. The registrant reported that in ICI Agrochemicals Report RJ0762B it was shown that paraquat was stable in soil samples stored frozen for at least 22 months. The stability of the test substance in the soil samples collected during this study appears to support that.
2. The 0- to 3.5-inch soil cores taken immediately posttreatment were divided into 0- to 2- and 2- to 3.5-inch segments prior to analysis; at all other sampling intervals, the cores were left intact. To make a direct comparison between the concentrations of paraquat detected at day 0 and all other sampling intervals, the Dynamac reviewer calculated the concentration in the 0- to 3.5-inch depth as shown for plot 211A, in which paraquat concentrations immediately posttreatment were 6.0 ppm in the 0- to 2-inch soil depth and 0.24 ppm in the 2- to 3.5-inch soil depth:

$$\frac{2(6.0) + 1.5(0.24)}{3.5} = 3.53 \text{ ppm}$$

The study authors calculated a mean paraquat concentration of 3.2 ppm for the 0- to 3.5-inch soil samples at day 0; however, the Dynamac reviewer calculated a mean concentration of 3.5 ppm.

3. The depth to the water table was 11 feet, and the slope of the field was 0.3%.
4. The test plots received the following additional pesticides during the study: one application each of Sencor (4.0 L, 0.5 lb/A), Monitor 45 (4.05, 1 qt/A), Orthene (75 S, 1.0 lb/A), Ridomil (2.0 EC, 0.1 gal/A), Triton B-1956 (1.0 qt/A), Poast (1.5 EC, 2.0 qt/A), and X-77 (1 qt/A); two applications of Kocide (50.0 WP, 3.0 lb/A) and Ambush (2.0 EC, 0.1 gal/A); four applications of Bravo 500 (4.2 FL, 4.0 pt/A) and crop oil concentrate (1-4 qt/A); six applications of Basagram (4.0 EC, 3-4 qt/A); and nine applications of Roundup (4.0 EC, 2-3 qt/A).

APPENDIX
STRUCTURE OF PARAQUAT



DER # 41352101

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The material not included contains the following type of information:

- Identity of product inert ingredients.
 - Identity of product impurities.
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 - Description of quality control procedures.
 - Identity of the source of product ingredients.
 - Sales or other commercial/financial information.
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 - The product confidential statement of formula.
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