

US EPA ARCHIVE DOCUMENT

field dissipation of the SC/L formulaiton 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 4.58 lb ai/A by broadcast spray to three plots (18 x 54 feet) of clay loam or silt loam soil (Table 1) in an apple orchard (trees 5-8 feet in height) located near Pullman, Washington, on August 2, 1987. An untreated plot (18 x 48 feet) was maintained as a control. The plots were rototilled (depth unspecified) 4 days prior to treatment. Soil cores (2-inch diameter, 0- to 3.5-inch depth; 1-inch diameter, 3.5- to 15.5- and 15.5- to 33.5-inch depths) were collected prior to treatment, immediately posttreatment, and at 30, 103, 228, 368, and 668 days posttreatment. Soil cores collected at 30, 228, and 368 days posttreatment were only sampled to a 15.5-inch depth; at all other intervals, the soil was sampled to 33.5 inches. The cores were stored frozen at -20 to -26 C for up to 22 months prior to extraction and analysis.

Prior to extraction, the 3.5- to 15.5-inch soil 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 0- to 3.5- and 15.5- 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. Recovery efficiencies from test soil fortified with paraquat (concentration unspecified) ranged from 61 to 92% of the applied.

DATA SUMMARY:

Paraquat (Gramoxone Super, 1.5 lb/gallon SC/L), at 4.58 lb ai/A, did not dissipate from plots of clay loam or silt loam soil in an apple orchard located in Washington that were treated on August 2, 1987. In the 0- to 3.5-inch soil depth, paraquat ranged from 1.4 to 4.4 ppm (mean 2.6 ± 0.85 ppm) during the study (up to 668 days) (Table III). Paraquat was not detected (<0.05 ppm) in the 4.5 to 10.0- and 10.0- to 15.5-inch soil horizons. In the 15.5- to 33.5-inch soil depth, paraquat was only detected (at ≤ 0.07 ppm) at 0 and 668 days post-treatment, indicating possible contamination of these samples during the sampling procedure.

During the study, rainfall plus irrigation totaled 29.8 inches, air temperatures ranged from -24 to 103 F, and soil temperatures (2-inch depth) ranged from 30 to 107 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 the claim that paraquat is stable in soils stored frozen for up to 22 months.
2. Daily meteorological data were incomplete (data for several months were not provided); however, mean monthly air and soil temperatures were provided and were comparable to 30-year mean monthly values obtained from the Pullman 2 NW, Washington NOAA Station. Monthly rainfall totals were also provided.
3. The nominal rate of application was 3.76 lb ai/A; however, the actual rate was 4.58 lb ai/A (Appendix 8).
4. The mean annual water table depth ranged from <1 to 6 feet. The slope of the field was 0-1%.
5. During the study, the test plots received applications of Roundup (4.1 EC, 2.0 pt/A) on September 15, 1987 and May 8, 1989.

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