

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD

STUDY IDENTIFICATION:

White, Stephen M. 1988. Field Dissipation Study on Lindane for Terrestrial Uses on Tomatoes, Porterville, California. Centre International d' Etudes du Lindane (CIEL)/Rhône-Poulenc. MRID No. 406225-03.

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TYPE OF STUDY: Terrestrial Field Dissipation

CONCLUSIONS:

1. EFGWB concludes that this study is not valid and therefore, does not satisfy the data requirements for Terrestrial Field Dissipation Study. Furthermore, the study is so seriously flawed that it can not be repaired and must be repeated.
2. Initial review of the report revealed that there appears to be a serious defect in the study related to lindane concentration found in the soil at the 1st two sampling dates after application (Tables 12 and 16). The lindane concentrations in the soil were less on sampling days 0 and 1 as compared to day 7. The lindane residues averaged 0.05-0.07 ppm on the former, as contrasted to 0.30-0.61 ppm on the latter. Explanation of the variability as stated by the author, "could be attributed to several factors such as formulation binding to the soil substrate and/or equilibrium of the residue on the soil."
3. However, the storage stability test showed that 95% of the 1.0 ppm lindane solution added to untreated soil was recovered at day 0. This seems to indicate that there was possibly some discrepancy in field methodology either in inadequate sampling or uneven distribution of the pesticide during application.
4. Because of the seriousness of this problem, no conclusions can be reached from the data presented in this report related to the dissipation of lindane from the soil studied and this study should be repeated in its entirety.

MATERIALS AND METHODS:

Lindane (0.71 lb ai/a) was sprayed to two test plots (cropped with tomatoes and bareground) located in California. The test

plots were subdivided into subplots and marked with numbered flags. Soil samples were collected from the treated plots at -1, 0, 1, 7, 14, 28, 60, 90, 120, 185, 270, 360, 450, and 540 days after lindane application. Untreated cropped and bareground plots were also divided into subplots and labeled and sampled at -1, 0, 1, 7, 14, 28, 90, 270, and 540 days after the lindane application to the treated plots. The subplots were randomly sampled to a depth of 30 cm with a stainless steel probe fitted with acetate core liners. Soil samples were taken from three subplots at each designated sampling interval. One soil sample consisted of ten cores taken within each subplot and composited by soil depth prior to analysis. Table 5 lists selected characteristics of the soil used in the study.

All soil samples were frozen prior to shipping. Analysis for lindane residues was performed using AOAC Method 29.013 entitled: "Pesticide and Industrial Chemical Residues." A method validation study was conducted on duplicate samples of an unspecified soil fortified with three rates of lindane (Table 1, p-144).

A storage stability test was conducted on non-treated soil from California fortified with 1.00 ppm lindane and kept in the freezer for six months. At this time the report only presents data for the first three months of the storage stability test (Tables 1, 2, 3, pp. 134-36).

Replicate soil samples were also fortified in the field with 0.20 or 1.00 ppm lindane (Table 8, p. 31).

All lindane residues in soil samples were determined using gas chromatography or HPLC.

REPORTED RESULTS:

The author reported that field spiking each of five 50 g samples of soil with either 0.04 or 0.20 ppm lindane resulted in recoveries ranging from 0 to 10.43 % (Table 8). Recoveries of lindane from non-treated soil spiked in the laboratory with 0.02 to 1.00 ppm ranged from 75-100 % with an average value based on 14 samples of 90.07%.

The author reported 209-352 and 187-390 days as the half-life for lindane in cropped and bareground soils, respectively, based on the average values of lindane in the 0-5 cm soil depth at each sampling date (Tables 12 and 16). In Figures 2 and 3, the author reported half-lives of 153 and 166 days as the half-life for lindane in cropped and bareground soils, respectively. The leaching data for lindane at various depths at each interval is summarized in Tables 12-19. The author reported that no detectable residues of lindane were found at soil depths below 5 cm until Day 7. The data showed detectable lindane residues in

the 5-10 cm soil depth up to 182 days after application. The author reported that the data indicated that lindane could leach below the 5-10 cm soil depth under the conditions of the experiment.

DISCUSSION:

1. EFGWB concludes that this study is not valid because of a serious defect in the study related to lindane concentration found in the soils at the 1st two sampling dates after application (Tables 12 and 16) and therefore, does not satisfy the data requirements for Terrestrial Field Dissipation Study.
2. The lindane concentrations in the soil were less on sampling days 0 and 1 as compared to day 7. The lindane residues averaged 0.05-0.07 ppm on the former, as contrasted to 0.30-0.61 ppm on the latter. Explanation of the variability as stated by the author, "could be attributed to several factors such as formulation binding to the soil substrate and/or equilibrium of the residue on the soil."
3. However, the storage stability test showed that 95% of the 1.0 ppm lindane solution added to untreated soil was recovered at day 0. This seems to indicate that there was possibly some discrepancy in field methodology either in inadequate sampling or uneven distribution of the pesticide during application.
4. The author did not offer an explanation of the discrepancy between the half-lives reported in the Tables 12 and 16 and Figures 2 and 3. In the tables the half-lives varied from 209 to 352 days and 187 to 390 days, respectively for the cropped and bareground plots; while in the figures, the half-lives are reported as 153 and 166 days, respectively for cropped and bareground plots.
5. Because of the seriousness of these problems, no conclusions can be reached from the data presented in this report related to the dissipation of lindane from the soil studied and this study should be repeated in its entirety.