Shaughnessy No.: 009001

Date Out of EFGWB: AUG 21 1988

AUG 21 1988

TO: G. LaRocca
Product Manager 15
Registration Division (H7505C)

FROM: Paul Mastradone, Section Chief
Environmental Chemistry Review Section #1
Environmental Fate and Groundwater Branch

THRU: Henry Jacoby, Acting Chief
Environmental Fate and Groundwater Branch
Environmental Fate and Effects Division (H7507C)

Attached please find the EFGWB review of:

Reg./File # : 52904-C

Chemical Name : Lindane

Product Type : Insecticide

Product Name : N/A

Company Name : Centre International d'Etudes du Lindane

Purpose : Review data submitted in response to Registration Standard

Date Received : 11/4/88 Action Code: 660

Date Completed : 8/21/89 EFGWB No. : 90033-37

Total Reviewing Time (decimal days): 35

Deferrals to :
_____ Ecological Effects Branch, EFED
_____ Science integration & Policy Staff, EFED
_____ Non-Dietary Exposure Branch, HED
_____ Dietary Exposure Branch, HED
_____ Toxicology Branch, HED

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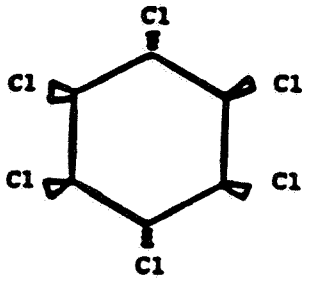
1.0 CHEMICAL:

Common Name: Lindane

Chemical Name: gamma- 1,2,3,4,5,6-hexachlorocyclohexane

Chemical Structure:



Chemical/physical properties:

molecular weight: 290.85
melting point: 112.5°C
solubility: 10 ppm in water at 20°C
vapor pressure: 9.4×10^{-6} mm Hg at 20°C.

2.0 TEST MATERIAL:

Lindane-UL-^{14}C, 20% emulsifiable concentrate, 25% wettable powder, 40% flowable.

3.0 STUDY/ACTION TYPE:

Review environmental fate data submitted in response to Registration Standard.

4.0 STUDY IDENTIFICATION:

4.1 The following studies were submitted for review:

Jordan, E. G. 1988. Metabolism of Lindane in Soil Under Aerobic and Anerobic Conditions. Centre International d' Etudes du Lindane (CIEL)/Rhone-Poulenc File No. 40223. MRID No. 406225-01.

White, Stephen M. 1988. Field Dissipation Study on Lindane for Terrestrial Uses on Peaches in Donalsonville, Georgia. Centre International d' Etudes du Lindane (CIEL)/Rhone-Poulenc. MRID No. 406225-02.

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

Spare, William C. 1988. The Volatilization of Lindane From Soil. (A Laboratory Study). 20% Emulsifiable Concentrate. Amended Final Report. Submitted by Rhone-Poulenc, Inc. on behalf of Centre International d' Etudes du Lindane (CIEL). MRID No. 406225-04.

Spare, William C. 1988. The Volatilization of Lindane From Soil. (A Laboratory Study). 25% Wettable Powder. Amended Final Report. Submitted by Rhone-Poulenc, Inc. on behalf of Centre International d' Etudes du Lindane (CIEL). MRID No. 406225-05.

Spare, William C. 1988. The Volatilization of Lindane From Soil. (A Laboratory Study). 40% Flowable Liquid. Amended Final Report. Submitted by Rhone-Poulenc, Inc. on behalf of Centre International d' Etudes du Lindane (CIEL). MRID No. 406225-06.

5.0 REVIEWED BY:

Richard J. Mahler
Hydrologist, Review
Section 1, EFGWB, EFED

Signature: Richard J Mahler
Date: August 21, 1989

6.0 APPROVED BY:

Paul J. Mastradone, Chief
Review Section 1, EFGWB, EFED

Signature: Paul J Mastradone
Date: AUG 21 1989

7.0 CONCLUSION:

1. EFGWB concludes that the aerobic soil metabolism (162-1) study is scientifically valid and satisfies the requirement for which the study was submitted. Based on the results of the study, EFGWB concludes that lindane is persistent in the aerobic soil environment with a half-life of 980 days in the sandy loam soil tested.

2. EFGWB concludes that the terrestrial field dissipation (164-1) study only partially satisfies the data requirement. Field dissipation studies should be conducted in at least two different sites which are representative of the areas where the pesticide will be used. Although two different sites were used, EFGWB concludes that the study (MRID No. 406225-02) at one site was scientifically valid, and that lindane dissipates slowly in the loamy sand soil studied with a half-life of between 65 and 107 days. Little, if any lindane will leach below the 5-10 cm soil depth since insignificant amounts of lindane residues were detected in this depth after 360 days in the soils. The study (MRID No. 406225-03) at the other site has been judged to not satisfy

the requirements due to an apparent serious defect in the study related to lindane concentration found in the soil at the 1st two sampling dates after application.

3. EFGWB concludes that the anaerobic soil metabolism study does not satisfy the data requirement for which the study was submitted and is considered supplemental because an adequate material balance was not reported in the study, and no attempt was made to determine the reasons for the inadequate material balance. EFGWB concludes that lindane will be stable in anaerobic conditions with a half-life of 37 days.

4. EFGWB concludes that the laboratory volatility study does not satisfy the data requirement for which the study was submitted because the studies were not carried out over a sufficient length of time to define lindane volatility decline curves, there was no a satisfactory explanation of how the author determined the actual concentration of lindane added to the soil or in the test soil, the experiments were not replicated, and all major formulation categories were not tested.

ENVIRONMENTAL FATE ASSESSMENT

Based on available data, EFGWB concludes that lindane has a low potential to leach in the soil environment and ultimately into the groundwater.

Lindane is stable to hydrolysis at normal pHs and temperature. Studies (supplemental) suggest that lindane is stable to photolysis in water.

Lindane degrades very slowly in the soil environment maintained under aerobic conditions. Aerobic soil metabolism studies show that lindane is persistent with a half-life of 980 days in a sandy loam soil. However, a study (supplemental) of lindane under anaerobic soil metabolism, showed that lindane is less stable than under aerobic conditions, with a half-life of 37 days.

Lindane has soil adsorption coefficients (K_d) in sand, loam, clay loam, and loamy sand, (3.8, 14.4, 16.5, 28.4, respectively) and EFGWB considers lindane to be non-mobile in these soil types.

In soil column leaching studies, less than 1% of the applied radioactivity was found in the leachate of the four soils studied (clay loam, loam, loamy sand and sand). Analysis of each 6 cm soil column segment, in the aged and unaged leaching experiments, indicated that most of the radioactivity remained in the top 12 cm for the clay loam

and loam, in the top 6 cm for the loamy sand, and in the top 18 cm for the sand.

Under field conditions, lindane was found to have a half-life of between 65 and 107 days in the loamy sand soil studied and did not move out of the top 15 cm of soil.

The environmental fate of lindane indicates that the chemical will be persistent in the environment and has a low potential to leach to the groundwater.

8.0 RECOMMENDATIONS:

Inform the registrant of the data deficiencies identified in each of the studies which do not satisfy the data requirement (laboratory volatility, 163-2; field dissipation-tomatoes, 164-1).

Specific deficiencies are listed in the attached individual Data Evaluation Records (DERs).

9.0 BACKGROUND:

Registration Division has requested EFGWB review of the environmental fate data which CIEL, acting on behalf of three registrants of lindane, has submitted in response to the Registration Standard for lindane.

10.0 DISCUSSION OF INDIVIDUAL STUDIES:

See attached DERs;

11.0 COMPLETION OF ONE-LINER:

One-liner updated.

12.0 CBI APPENDIX:

CIEL makes no claim of confidentiality for the submitted studies.