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009001
SHAUGHNESSY NO.

REVIEW NO.

EEB REVIEW

30 DEC 1986

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FILE OR REG. NO 52904-C

PETITION OR EXP. NO.

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RD ACTION CODE/TYPE OF REVIEW 660

TYPE PRODUCT(S) : I, D, H, F, N, R, S Insecticide

DATA ACCESSION NO(S). 265727

PRODUCT MANAGER NO. G. LaRocca (15)

PRODUCT NAME(S) Lindane Products

COMPANY NAME CIEL

SUBMISSION PURPOSE Submission of honey bee toxicity data to
support Registration Standard

SHAUGHNESSY NO. CHEMICAL, & FORMULATION & AI

009001 Gamma isomer of benzene hexachloride

EEB REVIEW

Lindane

100 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

The registrant (CIEL) submitted data from a honey bee residual toxicity study with lindane. The data were submitted to support the Registration Standard for lindane.

100.5 Precautionary Labeling

Current bee precaution labeling was not submitted.

101 Hazard Assessment

101.2 Likelihood of Adverse Effects on Nontarget Organisms (Honey Bees)

Data from the residual toxicity study show lindane to be highly toxic to honey bees as a dried foliar residue. Toxicity of residues may persist for 2 days following treatment. Overall, the likelihood of adverse effects on honey bees is high if bees are exposed to residues on treated crops.

101.4 Adequacy of Toxicity Data

A honey bee acute contact study was reviewed in the original Registration Standard for lindane. That study was determined to be valid, and showed lindane to be highly toxic to honey bees. On that basis, a requirement for a residual toxicity test was indicated in the data table of the lindane Standard.

The present data were submitted in response to the requirement in the Standard. EEB has determined that the study is valid and fulfills the data requirement for a residual toxicity study with honey bees. No additional testing with lindane on honey bees is indicated at this time.

101.5 Adequacy of Labeling

On the basis of the data reviewed by EEB, lindane products intended for outdoor use (foliar application) should bear the following label statement:

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

103 Conclusions

EEB has reviewed the submitted honey bee study. Appropriate bee precaution labeling is provided in section 101.5, above. No further honey bee testing is required for lindane at this time.

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DATA EVALUATION RECORD

1. Chemical: Lindane
2. Test Material: Lindane 20 EC, 25 WP, and 40 FLO
3. Study Type: Honey Bee - Toxicity of Residues on Foliage

Test Species: Apis mellifera

4. Study ID: Mayer, D.F. (1986) Small scale bee poisoning residual bioassay. Prepared by Washington State University, Prosser, WA. Submitted by CIEL, Brussels, Belgium. EPA Registration No. 52904-C. EPA Accession No. 265727.

5. Reviewed By: Allen W. Vaughan
Entomologist
EEB/HED

Signature: *Allen W. Vaughan*
Date: 12/24/86

6. Approved By: Norman J. Cook
Supervisory Biologist
EEB/HED

Signature: *Norman J. Cook*
Date: 12.31.86

7. Conclusions:

This study is scientifically sound, and shows lindane residues to be highly toxic to honey bees. When applied to alfalfa at 1.0 and 1.5 lb ai/acre, residues were highly toxic through 2 days posttreatment for all three formulations. At 0.5 lb ai/acre, all formulations were highly toxic through 8 hours posttreatment, with toxicity decreasing to a low level at 1 day posttreatment.

This study fulfills the guideline requirement for a residual toxicity test with honey bees.

8. Recommendations: N/A

9. Background:

This study was submitted in response to a requirement in the Lindane Registration Standard.

10. Discussion of Individual Tests: N/A

11. Materials and Methods:

- a. Test animals were worker Italian honey bees obtained from research colonies maintained by Washington State University (WSU).
- b. Test System: Small-scale bee poisoning tests were conducted with Lindane 20 EC (Prentiss Drug and Chemical Co., Lot #11276), Lindane 25 WP (Miller Chemical and Fertilizer Co., Lot #860303-02) and Lindane 40 FLO (Gustafson, Inc., Lot #M50321710) on honey bees during 1986. Each formulation was tested at 0.5, 1.0, and 1.5 lb ai/acre.

Lindane was applied to 0.0004-hectare plots of alfalfa with a Solo backpack sprayer equipped with a boom, using 1758 g/cm² pressure and 234 liters of water per hectare and foliage allowed to weather in the field. Field-weathered residual test exposures were replicated four times with four foliage samples per treatment and time interval. Alfalfa foliage samples (upper 15 cm portions of plants) were clipped into 2.5 to 5 cm lengths, and about 500 cm³ was placed in each cage. Cages were prepared from a 15 cm diameter plastic petri dish and a circular insert formed from a strip of metal screen (6.7 meshes/cm) 45 cm long and 5 cm wide. In one test, residual toxicity of lindane combined with Bond (Loveland Industries, Inc., Loveland, CO) was also tested.

Worker Italian honey bee colonies maintained by WSU were obtained from top supers of colonies and anesthetized with CO₂ to facilitate handling. Residual test exposures were replicated four times by caging 60 to 75 worker honey bees per cage in separate cages with each of four foliage samples per treatment and time interval. Bees in cages were fed syrup prepared from 50% sucrose and water in a wad of cotton (5 by 5 cm), and the bees held at 29.5 °C for 24-hour mortality counts.

- c. Statistics: No analysis was reported.

12. Reported Results:

Residues of all three formulations of lindane were highly toxic to honey bees caged on treated foliage. At 1.0 and 1.5 ai/acre, residual toxicity extended through 2 days following application. At 0.5 lb ai/acre, residues were highly toxic through 8 hours following application.

13. Study Author's Conclusions/QA Measures:

Results: Lindane at the higher rates was highly hazardous to honey bees and would cause bee mortality if applied on blooming crops or allowed to drift onto bloom where bees are foraging. At the 0.5 rate, lindane was moderately hazardous and possibly could be used as an evening application without noticeable bee mortality. The addition of the sticker Bond appeared to reduce bee mortality

QA measures were not reported.

14. Reviewer's Discussion and Interpretation of the Study

- a. Test Procedures: Procedures were in accordance with those recommended in the Guidelines. There were no problems in this regard.
- b. Statistical Analysis: None reported.
- c. Discussion/Results: This study is scientifically sound. Lindane residues are highly toxic to honey bees. Although the author concluded that addition of a sticker appeared to reduce bee mortality, results were inconclusive.
- d. Adequacy of Study:
 1. Classification: Core.
 2. Rationale: Guideline protocol.
 3. Reparability: N/A.

15. Completion of One-Liner: N/A.16. CBI Appendix: N/A.