

US EPA ARCHIVE DOCUMENT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, DC 20460

3-20-90

OFFICE OF  
PESTICIDES AND  
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Aquatic Invertebrate Life-cycle Study for Daphnia magna  
(Accession No. #400561-06) for Lindane Technical

FROM: *for* James W. Akerman, Chief  
Ecological Effects Branch  
Environmental Fate and Effects Division (H-7507-C)

TO: George LaRocca (15)  
Insecticide-Rodenticide Branch  
Registration Division (H-7505-C)

Attached please find the Ecological Effects Branch review of the Lindane Technical Aquatic Invertebrate Life-cycle Study for Daphnia magna (Accession No. 400561-06) in response to the Lindane Registration Standard. The results of this study are as follows:

STUDY IDENTIFICATION: Surprenant, D.C., The Chronic Toxicity of Lindane to Daphnia magna Under Flow-through Conditions. Study # 10566.0286.6104.130. Prepared by: Springborn Bionomics, Inc., Wareham, Mass. Submitted by: Centre International D'Etude du Lindane, Bruxells, Belgium. Acc# 400561-06.

CONCLUSIONS: This study is rated invalid due to the absence of raw data necessary to review an early life stage study. The study may be upgraded if these data are provided.

If you have any questions concerning these studies, please contact Jeffrey Bigler (557-0783) of my staff.

DATA EVALUATION RECORD

1. CHEMICAL: Lindane

2. TEST MATERIAL: Lindane Technical - 99.5% a.i.  
(A white powder)

3. STUDY TYPE: Aquatic Invertebrate Life-cycle Study.

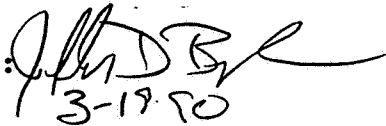
Species tested - Daphnia magna

4. STUDY IDENTIFICATION: Surprenant, D.C., The Chronic Toxicity of Lindane to Daphnia magna Under Flow-through Conditions. Study # 10566.0286.6104.130. Prepared by: Springborn Bionomics, Inc., Wareham, Mass. Submitted by: Centre International D'Etude du Lindane, Bruxells, Belgium. Acc# 400561-06.

5. REVIEW BY:

Jeffrey D. Bigler  
Fishery Biologist  
Ecological Effects Branch  
Environmental Fate and  
Effects Division (H7507C)

Signature:



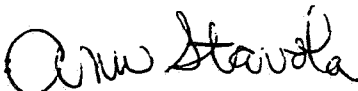
Date:

3-19-90

6. APPROVED BY:

Ann Stavola  
Acting Head, Section 3  
Ecological Effects Branch  
Environmental Fate and  
Effects Division (H7507C)

Signature:



Date:

3/20/90

7. CONCLUSIONS: This study is rated invalid due to the absence of raw data necessary to review an aquatic invertebrate life-cycle study. The study may be upgraded if these data are provided.

8. RECOMMENDATIONS: N/A

9. BACKGROUND: These data were submitted in support of the Lindane Registration Standard.

10. DISCUSSION OF INDIVIDUAL TEST - N/A.

11. MATERIALS AND METHODS:

A. Test Organisms: Daphnia magna used in this study were obtained from cultures raised at the Springborn laboratories. The daphnids were <24 hours old at the test initiation.

B. Test System: Dilution water was fortified well water filtered through a resin column. Glass 1.8 liter battery jars with a 40 mesh screen at the drain were used for the exposure system. Each test level was replicated 4 times. Test solution was delivered to provide approximately 6 volume turnovers per 24 hour period. The photoperiod was 16 hours light and 8 hours dark. A temperature controlled water bath maintained the test solution temperature at  $20^{\circ} \pm 1^{\circ}\text{C}$ .

C. Test Design: Twenty daphnids were impartially assigned to each replicate for a total of 80 daphnids per test level. Adult survival and offspring production were recorded daily from day 7 through day 21. Offspring were removed, counted and discarded.

The test animals were fed a mix of Fleishmanns yeast and green algae daily throughout the study.

Temperature was measured daily in one replicate vessel of each treatment level and control throughout the 21 day period. DO was measured every weekday in one replicate of each treatment and control level. Total hardness, alkalinity, specific conductivity and pH were measured weekly in one replicate of each treatment and control level.

Water samples were collected weekly from 2 replicates from each treatment and control level and analyzed for lindane.

D. Dose: A solvent control (36 ul/l acetone), dilution water control and five nominal concentrations of 130, 65, 33, 16, and 8.0 ug/l were the test levels selected. The mean measured concentrations were 110, 54, 27, 15, and 5.6 ug/l.

E. Statistics: Williams' test was used with the following endpoints to evaluate differences between test concentrations and the solvent control:

- Reproduction
- Survival

12. REPORTED RESULTS: (excerpted from study)

"Reproduction was the only indicator of the toxicity of Lindane to Daphnia magna. During the 21-day test daphnids in the highest treatment level (110 ug/l) produced an average of 54 offspring per female which was significantly ( $P = 0.05$ ) less than the number of offspring produced by the solvent control organisms. Reproduction among organisms exposed to all measured Lindane concentrations  $\leq 54$  ug/l was comparable to the reproduction of the solvent control organisms. The mean survival among daphnids exposed to all concentrations of Lindane tested ranged from 91 to 95% which was comparable to the survival of the solvent control daphnids (90%)."

"Based on these data, the estimated maximum acceptable toxicant concentration (MATC) after 21 days exposure was  $> 54$  ug/l  $< 110$  ug/l of Lindane (geometric mean MATC = 77 ug/l)."

13. STUDY AUTHORS' CONCLUSIONS/QA MEASURES:

"The data and report prepared for this study were produced and compiled in accordance with all pertinent EPA Good Laboratory Practice regulations except in the case of characterization and verification of the test substance identity. Maintenance of these records is the responsibility of the test sponsor."

"Based on these data, the estimated maximum acceptable toxicant concentration (MATC) after 21 days exposure was  $> 54$  ug/l  $< 110$  ug/l of Lindane (geometric mean MATC = 77 ug/l)."

14. REVIEWER'S DISCUSSION AND INTERPRETATION OF THE STUDY:

- A. Test Procedures: This review cannot be completed until all raw data relative to the study are submitted, including any and all notes or comments by the investigator(s).
- B. Statistical Analysis: N/A
- C. Discussion/Results: This study is rated invalid due to the unavailability of the raw data collected during the course of the study.

D. Adequacy of Study:

Classification - Invalid.

Rational - Lack of raw data.

Repairability - An upgrade from invalid may be made, depending on a review of the required data.