(9-4-94)

DATA EVALUATION RECORD

1. **CHEMICAL:** S-Methoprene
Shaughnessey No. 105401

2. **TEST MATERIAL:**
ALTOSID Liquid Larvacide, 5% s-methoprene
ALTOSID XR Briquets, 1.8% s-methoprene
ALTOSID Briquets, 7.9% s-methoprene
ALTOSID Pellets, 4% s-methoprene
experimental sand granules, SAN 810 I 1.3 GR, 1.3% s-methoprene.

3. **STUDY TYPE:** Non-Guideline. Microcosm Study to Evaluate Methoprene Concentrations Present Over Time.

4. **CITATION:** Judy, D., and B. Howell. 1992. Concentrations of Methoprene Found in Freshwater Microcosms Treated with Sustained Release ALTOSID Formulations. Report No. 39541. Prepared by ABC laboratories, Inc., Columbia, MO. Submitted by Zoecon Corp. EPA MRID No. 42811202.

5. **REVIEWED BY:**

Joanne S. Edwards, M.S.
Entomologist
Ecological Effects Branch
Environmental Fate and
Effects Division (7507C)

Signature: Joanne S. Edwards
Date: 8/31/94

6. **APPROVED BY:**

Leslie W. Touart, Ph.D.
Supervisory Biologist
Ecological Effects Branch
Environmental Fate and
Effects Division (7507C)

Signature:
9-4-94 **Date:**

7. **CONCLUSIONS:**

Under the conditions of this 35-day microcosm study in which methoprene formulations (liquid, sustained release briquets, pellets, and sand granules) were applied to microcosm tanks (12 ft diameter X 4 ft deep lined with polyvinyl chloride plastic liners; two replicates per formulation), no methoprene residues were detected in any sample analyzed at or above 10 ppb. The highest residue found, 8.35 ppb, was in a sample taken from a microcosm tank treated with a sustained release (7.9%) briquet formulation on day 7.

No other conclusions can be drawn. This study cannot be used to assess environmental concentrations of methoprene in

aquatic environments or to negate a presumption of risk to aquatic organisms, since the results cannot be extrapolated to use under typical field conditions (also see comments under item 14).

8. **RECOMMENDATIONS:** N/A.

9. **BACKGROUND:** This is a non-guideline study submitted by Zoecon. The purpose of the study was to determine methoprene concentrations present over time in aquatic microcosms treated with various methoprene formulations.

10. **DISCUSSION OF INDIVIDUAL TESTS:** N/A.

11. **MATERIALS AND METHODS:**

A. **Test Animals:** N/A

B. **Test System:** The test site was located near Oxford, MS. Twelve new microcosm tanks were employed consisting of 12-ft diameter X 4 ft deep steel tanks lined with polyvinyl chloride plastic liners. Each tank received 5-6 in of loamy sand sediment characterized as bulk density 1.46 g/cc; cation exchange capacity 5.6 meq/100 g; pH 5.2; moisture at 1/3 bar 10.7%; and % organic matter 0.3%. Each tank was filled with 6 in of water from an unused mesocosm pond (7 in at time of application due to natural precipitation). The water feeding the mesocosm pond was a spring-fed creek.

D. **Design:** Twelve tanks/two replicates per treatment; one control; treatments randomly assigned to tanks within each replicate. The tanks were set up Sept. 3/4, 1991, sediment and water was added Oct. 1-3, and applications were made Oct. 15. The applications were as follows:

ALTOSID Liquid Larvacide, 5%, 310 uL formulation
ALTOSID XR Briquets, 1.8%, 1 briquet
ALTOSID Briquets, 7.9%, 1 briquet
ALTOSID Pellets, 4%, 11.77 g formulation
sand granules, 1.3%, 23.55 g formulation

Application of the sand granules and pellets were made using hand-cranked spreaders. The liquid formulation was applied with a plastic squeeze bottle. Each briquet was placed in the center of the tank using a water sampling pole.

Water samples were taken for analysis of s-methoprene: pre-application, post-application 1, 2, 4, 7, 14, 21, 28, and 35 days. Four water samples (each sample

2

consisting of 10-12 individual samples to make a composite 1000 mL sample) were taken from each of the twelve tanks on each date. Field quality control samples were taken on day 1, 14 and 35. Analysis of samples was by gas chromatography using flame ionization detector.

A water sample was characterized for pH hardness alkalinity and conductivity prior to test initiation and two water samples were taken at the end of the study. Air and water daily temperatures were recorded using a Unidata data logger. Tank temperatures were also checked using thermometers which were installed in half of the tanks. Two rain gauges monitored rainfall. Climatological data were gathered daily for 1 wk and then 3X per week until termination of the study at day 35.

E. **Statistics:** Statistic Analysis (Tukey's HSD test) was used to compare means from treatments at each sampling time.

12. **REPORTED RESULTS:**

Water characteristics are given in Table 1. The authors stated there was general close agreement between the results from the presample and the Day 35 sample, indicating no adverse effects from water quality parameters on the study results.

The method validation showed an average recovery of s-methoprene (95.01% purity) from spiked samples of 88.9 $\pm$ 8.93% and 93.2 $\pm$ 7.26% for methoprene (MPM, surrogate standard, 95.5% purity).

The minimum reliable quantitation limit of methoprene was 0.2 ppb (lowest level at which acceptable recoveries were achieved).

Recovery of fortified control water samples spiked at 0.2, 0.4, and 200 ppb showed an average % recovery of 88.8 $\pm$ 17.9% for s-methoprene and 97.5 $\pm$ 12.4% for MPM.

A summary of the methoprene residues found in the test samples is attached (ABC LABS NO. 39541-150). The sample values ranged <0.2 - 8.09 ug/L. A statistical comparison of treatments by sampling interval is provided in the attached Table (ABC LABS NO. 39541-30). The highest concentrations from the application of ALTOSID liquid Larvacide, ALTOSID XR Briquets, and SAN 810 I 1.3 GR were found on Day 1 or 2 post-application. The highest concentration from the use of

ALTOSID Briquets and ALTOSID Pellets was found on Day 7 post-application.

13. STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:

The study authors concluded that the data indicate that methoprene applied as sustained release briquets, pellets, or granules did not exceed the estimated environmental concentration of methoprene produced by the application of ALTOSID Liquid Larvacide at the maximum application rate of 4 fl oz/0.5 acre feet of water (=10 ug (S)-methoprene/L =10 ppb).

A GLP compliance statement was included in the report indicating that the study was conducted in accordance with USEPA GLP Regulations with one exception; ten-year climatological data were obtained from the National Oceanic and Atmospheric Administration station in Memphis, TN.

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

A. **Test Procedure:** In general, the test procedures in followed good experimental design. This is a non-guideline study. The following comments apply to the experimental design:

o Water quality measurements were consistent as reported by the study authors, but showed great variability. This may or may not have affected the results of the study.

o The methods used by the study authors in calculating application rates employed in the microcosm study were confusing, but were verified to be equivalent to the rates specified by the study authors. For the ALTOSID XR Briquets (1.8%) and ALTOSID Briquets (7.9%) the rate was 1 briquet/113 sq ft. For the ALTOSID Pellets, 4%, 11.77 g formulation/113 sq ft is equivalent to 4.5 kg/A (1 kg = 2.2046 lb; 4.5 kg/A =10 lb/A) of formulation. For the sand granules, 1.3%, 23.55 g formulation/113 sq ft is equivalent to 9 kg/A of formulation (=19.8 lb/A). For the ALTOSID Liquid Larvacide, 5%, 310 uL formulation is equivalent to 4 oz/A (1 oz = 29.573 mL; 310 uL = 0..31 mL; 0.31 mL =0.0105 oz; 0.0105 oz/113 sq. ft).

o Sediment samples were not taken for analysis.

o The PVC liner may or may not have had an effect on the concentrations of methoprene detected in the samples.

4

o The study was conducted in the Fall season (October 15 through November 19) in a southern state, Mississippi. The average daily temperature was 48 °F. There was one snowfall event (0.75 inches) and one occurrence of thin ice forming in the tanks. The timing of the application of this study may or may not have had an effect on the concentrations of methoprene detected in the samples.

B. Statistics: No verification of the statistics was performed.

C. Discussion/Results:

Under the conditions of this 35-day microcosm study in which (s)-methoprene formulations (liquid, sustained release briquets, pellets, and sand granules) were applied to microcosm tanks (12 ft diameter X 4 ft deep lined with polyvinyl chloride plastic liners; two replicates per formulation), no methoprene residues were detected in any sample analyzed at or above 10 ppb. The highest residue found, 8.35 ppb, was in a sample taken from a microcosm tank treated with a sustained release (7.9%) briquet formulation on day 7.

No other conclusions can be drawn. This study cannot be used to assess environmental concentrations of (s)-methoprene in aquatic environments or to negate a presumption of risk to aquatic organisms, since the results cannot be extrapolated to use under typical field conditions. The study authors have incorrectly concluded that methoprene applied as sustained release briquets, pellets, or granules do not exceed the estimated environmental concentration (EEC) of methoprene produced by the application of ALTOSID Liquid Larvacide at the maximum application rate.

D. Adequacy of the Study:

(1) **Classification:** Supplemental
(2) **Rationale:** Does not fulfill any EPA guideline requirement.
(3) **Repairability:** No

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