DATA EVALUATION RECORD

1. CHEMICAL: Avermectin B1 (MK-936)

2. FORMULATION: 90.5%, Tech.

3. CITATION: Ward, G.S. 1983. Acute toxicity of MK-936 Technical to pink shrimp (Penaeus duorarum). Prepared by EG & G Bionomics, Pensacola, Fla.; submitted by Merck, Sharp + Dohme, Three Bridges, N.J. Reg. No. 50658-EUP-R. Acc. No. 252115.

4. REVIEWED BY: John J. Bascietto
Wildlife Biologist
EEB/HED

5. DATE REVIEWED: 3/19/84

6. TEST TYPE: Acute toxicity- estuarine/marine - 96 HR. LC_{50}

A) Pink shrimp (Penaeus duorarum)

7. REPORTED RESULTS:

96-Hr. LC_{50} = 1.6 (0.5-16) ug/l

8. REVIEWER'S CONCLUSIONS:

The study is not acceptable to fulfill the guidelines requirement because the test vessels were aerated without determining the actual (analytical) concentrations of toxicant. Only the nominal concentrations were reported. It may be concluded that the material is at least "very highlyl toxic" to pink shrimp.

9. Materials/Methods

A. Test Procedures:

Shrimp were collected from the Gulf of Mexico (adjacent to testing facility) and held for 6 days. No mortality for 48-hr prior to test. Tests were conducted in natural seawater (filtered; 5 um pore).

Test vessels were 19-l glass with 15-l test solution or control seawater. Salinity was 28°/oo and temp. was maintained at 22°C. Ambient lighting was supplemented by fluorescent. Three (3) shrimp per vessel were added within 1 hr of the addition of toxicant. All treatments were replicated 4x. Containers were aerated. Shrimp were not fed. Nominal Test concentrations were 0.5, 1.0, 2.0, 4.0, 8.0 and 16 ppb. Solvent was nanograde acetone. Shrimp were 28-39 mm ($\bar{x}$ = 33 mm) length; 0.15 - 0.46 g, wet weight ($\bar{x}$ = 0.3 g). Loading was 0.06 g/l.

B. Statistical Analysis

Stephan's (1977) LC_{50} computer program was used; 24-and 48 hr LC_{50} values were computed by probit method; 72- and 96-hr LC_{50} values were computed by the binomial probability method.

10. Results

Nominal Concentration (mg/l; ppb)	Percent Mortality* 24-Hr	48-Hr	72-Hr	96-Hr
Control	0	0	0	0
Solvent Control	0	0	0	0
0.5	0	0	0	17
1.0	0	8	25	42
2.0	0	8	17	25
4.0	25	42	58	58
8.0	17	25	25	50
16.	58	67	100	100

* 12 shrimp per concentration were tested (3 shrimp/vessel; 4 replicates)

Calculated LC_{50} + 95% c.i. (nominal):

HR	LC50 (ppb)	95% c.i. (ppb)
24	14	8.9 - 42
48	10	6.1 - 32
72	2.8	0.5 - 16
96	1.6	0.5 - 16

11. Reviewer's Evaluation

A. Test Procedure: The procedures were acceptable under EPA guidelines except that the analytical (actual) concentrations of toxicant tested were not determined initially nor during the experiment. Because the test was aerated it is necessary to do the analytical work.

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B. Statistical Analysis: EEB did not validate the $LC5_0$, but the method used in the study is the same as that used by EEB. The statistics were not validated because the study is unacceptable.

C. Results/Discussion

Since the study was aerated the analytical concentrations should have been determined in order to account for any possible volitilization of the toxicant with the aeration, or for other effects of aeration on the toxicant's persistence or its interaction with the shrimp. Since no analytical concentrations were determined EEB cannot accept the "nominal" values. It is not known, for example, whether the LC_{50} is actually much lower than 1.6 ppb, which could be the case if a significant amount of toxicant volitilized or degraded in solution. The "reported results" are unacceptable, other than to say that the material is at least "very highly toxic".

Raw data on replicates at 0.5 and 1.0 ppb was not submitted.

D. Conclusions

1. Category: Invalid.

2. Rationale: - test was aerated without determining the actual (analytical) concentrations of toxicant tested.
   - The raw data ~~for 0.5 ppb and 1.0 ppb~~ was not submitted. ~~—~~ data submitted 3/26/85 - JPS

3. Repair: ~~None possible because the analytical conc. must be determined during the test.~~
   → see review dated 3/27/85