UNDATED

DATA EVALUATION RECORD

1. **CHEMICAL:** Molinate
Shaughnessey No. 041402

2. **TEST MATERIAL:** Molinate technical; S-ethyl hexahydro-1H -azepine-1-carbothioate; Test substance No. T256; 99% w/w active i straw-colored liquid.

3. **STUDY TYPE:** Growth and Reproduction of Aquatic Plants -- Tier 2 Tested: Skeletonema costatum.

4. **CITATION:** Smyth, D.V., J.F. Tapp, S.A. Sankey and P.A. Johnson. 1 Molinate: Determination of Toxicity to the Marine Alga Skeletone Laboratory Project No. T256/C. Conducted by Imperial Chemical Indu Brixham, Devon, UK. Submitted by ICI Agrochemicals, Fernhurst, S EPA MRID No. 416136-13.

5. **REVIEWED BY:**

Mark A. Mossler, M.S. **Signature:**
Associate Scientist II
KBN Engineering and **Date:**
Applied Sciences, Inc.

6. **APPROVED BY:**

Louis M. Rifici, M.S. **Signature:**
Associate Scientist II
KBN Engineering and **Date:**
Applied Sciences, Inc.

Henry T. Craven, M.S. **Signature:**
Supervisor, EEB/HED
USEPA **Date:**

7. **CONCLUSIONS:** This study is scientifically sound but does not meet guideline requirements for a Tier 2 non-target plant growth and rep The study was not conducted for the recommended length of time (5 4-day EC_{25} and EC_{50} values of molinate for S. costatum were 3.2 and ai/l, respectively. The NOEC was determined to be 0.94 mg ai/l.

8. **RECOMMENDATIONS:** N/A

9. **BACKGROUND:**

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

11. **MATERIALS AND METHODS:**

A. **Test Species:** The diatom used in the test, Skeletonema costat originally came from the Culture Centre of Algae and Freshwater Biological Association, The Ferry House, Ambleside, UK. The culture has been kept under axenic conditions since Stock cultures were maintained in synthetic nutrient medium Alexander, 1980) at a temperature of 20 ±1°C with orbital sha rpm. Cool white light provided 4340 lux illumination on a photoperiod. Cultures that were growing logarithmically we inoculum for the test.

B. **Test System:** Test vessels used were glass 250 ml conical flas with foam stoppers. The test medium was the same as that culturing, with a pH of 8.2.

The test vessels were kept in an incubator with environmental like those employed in culturing.

C. **Dosage:** Nominal rates of 1.0, 2.0, 4.0, 8.0, 16.0, 32.0, 64.0 control, and a blank (no algal inoculum) were used for the def

D. **Test Design:** The highest nominal rate of 64 mg ai/l was prepa direct addition of the test material to sterile culture media stock were added to sterile culture medium to obtain the lo concentrations. All solutions were clear and colorless. milliliters of the test solution were placed in each of three flasks (3 per treatment level). The control flasks were repli

An inoculum volume of 0.945 ml was used to provide 1.0×10^4 cells/ml per flask. Cell counts were performed ever for 4 days using an electronic particle counter. The randomized by rows within the incubator.

At the start of the test, samples were taken of each test solu excess remaining after filling the test vessels, and were an concentration of test substance by gas chromatography

(GC). At the end of the test, each blank solution was s analyzed in the same manner.

The pH of the test solutions were measured at test init termination. Light intensity was measured once during the exp temperature was monitored continuously.

E. Statistics: For each nominal concentration, the mean of the m concentration from the blanks on day 0 and day 4 was calcula mean measured concentrations were then used as the basis for analysis. Area under the growth curve and growth rate were e a function of time. Probit and Dunnett's analysis ($p \leq 0.05$) we on both of these parameters at day 4.

12. REPORTED RESULTS: Algal cell densities for the control and the exp concentrations throughout the test are given in Table 2 (attached).

Measured concentrations on day 0 were 94% to 106% of nominal whi measured concentrations were between 84% and 98%. The means o measured concentrations were 0.94, 2.0, 3.9, 8.2, 16.0, 30.0, and 5

Increasing concentrations of molinate had increasingly inhibitory e growth and reproduction of Skeletonema costatum.

By day 4, the effect of the test material on the area under the relative to the control, ranged between 7% and 101% inhibitio attached). The EC_{50} was 4.3 mg ai/l with confidence limits of 1.8

By day 4, the effect of the test material on the growth rate, rela ranged between -7% (stimulation) and 118% inhibition (Table 4, att EC_{50} was 10.0 mg ai/l with confidence limits of 2.5 and 43.0 mg ai/

Results from Dunnett's analysis indicated that the areas under the on day 4 at the six highest concentrations were significantly controls. The NOEC was determined to be 0.94 mg ai/l. The resu growth rate data demonstrated that the three highest concentration were significantly less than the controls. The NOEC was reported a

The pH in the control and the exposure concentrations were 9.1 an respectively, by test termination. The hourly temperatures range 20.5°C.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:**
No conclusions were made by the authors.

Good laboratory practice and Quality Assurance Unit statements were the report indicating compliance with EPA Good Laboratory Practic under the Federal Insecticide, Fungicide, and Rodenticide Act.

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

A. **Test Procedure:** The test procedure and the report were genera accordance with the SEP and Subdivision J guidelines, excep following deviations:

The dissolved oxygen and conductivity of the test solution measured.

Studies were conducted for 4 days. All algal studies should for 5 days.

The age of the organisms used for inoculum was not stated.

The light intensity was 4340 lux. The recommended intensity i

The cell inoculum was 6400 cells/ml rather than 10,000 cells/m

Although the raw data were submitted for cell density data, t raw data for area under the growth 7nncurve and growth rate we

No subtoxic (EC_{25}) values were reported.

B. **Statistical Analysis:** The reviewer used a computer program to statistical analysis (attached) of the 4 day cell density da the NOEC. The area under the growth curve data were used determination of EC values. Probit and Dunnett's tests we determine the EC and NOEC values, respectively. The resu Dunnett's analysis were in agreement with the authors' valu from area under the growth curve data. However, the NOEC deri the growth rate data was more conservative (i.e., 0.94 mg NOEC will therefore be taken to be 0.94 mg ai/l. The review EC values that were slightly higher than the authors'. Sinc EC_{50} value of 4.3 mg ai/l is more conservative, and will be non-target plants, it will be taken to be the correct EC value

C. **Discussion/Results:** Although the dosages were not adjusted fo purity of the test material, the reviewer reported rates in because of the purity of the test material (99%).

This study is scientifically sound but does not meet th requirements for a Tier 2 non-target aquatic plant study. T not conducted for the recommended length of time (5 days). Skeletonema costatum was increasingly inhibited by increasing of molinate.

D. **Adequacy of the Study:**

(1) **Classification:** Supplemental.

(2) **Rationale:** The study was not conducted for the correct l time (i.e., 5 days).

(3) **Repairability:** No.

15. **COMPLETION OF ONE-LINER:** Yes, 6/4/91.