9-13-91

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

37

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

MEMORANDUM

SUBJECT: Review Studies of Sencor
DP Barcode: 166533
ID No: 101101

FROM: Douglas J. Urban, Acting Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)

Douglas J Urban 9/13/91

TO: Walter Waldrop, PM 71
Reregistration Branch
Special Review/Reregistration Branch (H7508W)

BACKGROUND

In order to reregister Sencor, Mobay Chemical Corporation has sent two estuary/marine studies for review:

72-3A Mollusc 96-hour flow-through shell deposition with Eastern oyster

Dionne, Emily, and Suprenant, Donald C. Acute Toxicity of Sencor to Eastern Oysters (*Crassostrea virginica*). Study performed by Springborn Bionomics, Inc. 790 Main Street, Wareham, Massachusetts 02571 in March 1986 for Mobay Chemical Corporation, Stillwell, Kansas. MRID No. 470234-011. Toxicology Report No. 728. DP Barcode 166533 STUDY No. 91755.

72-3B: Sheepshead Minnow 96-hour static acute

Nicholson, Richard, and Suprenant, Donald C. Acute Toxicity of Sencor to Sheepshead Minnow (*Cyprinodon variegatus*). Study performed by Springborn Bionomics, Inc. 790 Main Street, Wareham, Massachusetts 02571 in March 1986 for Mobay Chemical Corporation, Stillwell, Kansas. MRID No. 470234-012. Toxicology Report No. 729. DP Barcode 166533 STUDY No. 91756.

REVIEW SUMMARY

SPECIES	TEST MATERIAL	RESULTS	MRID#	AUTHOR	FULFILLS REQMNTS.
Mollusc	Sencor (92.6%)	96 Hour EC_{50}=52ppm	470234-011	Nicholson & Suprenant	No[1]
Sheepshead	Sencor (92.6%)	96 Hour LC_{50}=52ppm	470234-012	Nicholson & Suprenant	No[1]

[1] The raw data is needed for this study to be completely evaluated.

REQUIREMENTS FOR REGRISTRATION

In addition to the raw data for the mollusc and sheephead studies, the following animal studies are still required:

71-2B Acute avian dietary with the mallard

72-4A Fish Early life stage

72-4B Invertebrate life cycle

Three plant studies are also still required:

123-1A Seed germination/seedling emergence

123-1B Vegetative vigor

123-2 Aquatic plant growth

If you have any questions, please call Heather Mansfield (557-0064).

D166533
DPBARCODE (RECORD)
101101
SHAUGHNESSY NO

REVIEW NO.

EEB REVIEW

DATE IN: 07-07-91 OUT:

CASE # : 819350 REREG CASE #:
SUBMISSION # : S399515 LIST A B C D
ID # : 101101

DATE OF SUBMISSION 03-01-86

DATE RECEIVED BY EFED 07-07-91

SRRD/RD REQUESTED COMPLETION DATE 09-24-91

EEB ESTIMATED COMPLETION DATE 09-24-91

SRRD/RD **ACTION** CODE/TYPE OF REVIEW 602 - Phase 3 Response

MRID #(S) ~~00161502, 00161503~~ 470234-011, 470234-012

DP TYPE 001 - Submission Related Data Package

PRODUCT MANAGER, NO. W. Waldrop (71)

PRODUCT NAME(S) Sencor

TYPE PRODUCT F R I N H D Herbicide

COMPANY NAME Mobay Chemical Corp.

SUBMISSION PURPOSE Review data and update status of

INCLUDE USE(S) EEB data requirements

COMMON CHEMICAL NAME Metribuzin

DATA EVALUATION REPORT

1. Chemical: Sencor/101101

2. Test Material: Technical;92.6% a.i.
white/grayish powder

3. Study Type: Mollusc 96-hour flow through shell deposition

4. Study Identification: Dionne, Emily, and Suprenant, Donald C. Acute Toxicity of Sencor to Eastern Oysters (*Crassostrea virginica*). Study performed by Springborn Bionomics, Inc. 790 Main Street, Wareham, Massachusetts 02571 in March 1986 for Mobay Chemical Corporation, Stillwell, Kansas. MRID No. 470234-011. Toxicology Report No. 728. DP Barcode 166533 STUDY No. 91755.

5. Reviewed By:
Heather N. Mansfield, Zoologist
Ecological Effects Branch
Environmental Fate and Effects Division
Signature: Heather Mansfield
Date: 9/12/91

6. Approved by:
for Norman J. Cook, Head, Section 2
Ecological effects Branch
Environmental Fate and Effects Division
Signature: Allen W. Vaughan
Date: 9.12.91

7. Conclusions: This study has been reviewed and has been found to be scientifically sound. It does not, however, fulfill the requirements for a mollusc shell deposition study as the raw data was not submitted.

The reported results indicate that Sencor slightly toxic to the Eastern oyster

The unconfirmed NOEC is < 33 ppm and the study author's EC_{50} is 52 ppm, with a confidence interval of 42-26 ppm. Raw data is necessary for EEB to confirm.

8. Recommendations: EEB needs the raw data on mortality and shell deposition at all test concentrations in order to do a complete evaluation of this study.

9. Background: This study was reviewed as a part of the reregistration of Metribuzen.

Nov 92

10. Discussion of individual studies: N/A

11. Materials and Methods:

Test Material: Sencor
Test Organism: Eastern Oyster
Source: Aquaculture Research Corporation, Dennis Massachusetts--reared in natural flowing seawater from Massachusetts Bay
Size (mean height) : 39 ± 4mm

Shipping: Oysters were outside of water for no more than two hours

Acclimation: 7 days
Oysters were held in a wooden, epoxy-painted tray through which sea water was continuously pumped. Two days before the start of the test, the oysters were cleaned of attached organisms

Container: Glass aquaria 60 x 30 x 30 cm
Test Solution Volume: ≈ 18 L
Test dilution water: unfiltered seawater from Cape Cod Canal, Bourne, Massachusetts (originating either from Buzzards Bay or from Massachusetts Bay)
Preparation of solution: 100 mg/L stock solution made by dissolving ≈ 54 g Sencor in 500 L unfiltered sea water and mixing for two hours.
Nominal concentrations: 100, 56, 31, 18, and 9.8 ppm.
Concentration: Measured day 0 and day 4
Salinity: 32 ppt
Temperature: 20 C±2
Photoperiod: 16:8 light (fluorescent):dark
Flow speed (test solution to each aquarium): 75 mL/min
Flow speed (recirculating test solution): 1.75 L/min

Control(s): Unfiltered sea water
Replicates: 2 per treatment level
Organisms per treatment level: 20 per replicate
Feeding: Before and during the study, oysters were fed algae (Isochrysis galbana) such that the density was 10^5 cells/mL.

Organism preparation: 24 hrs. before test initiation, 2-5 mm of peripheral shell growth was ground off of each oyster. Immediately before test initiation, the shell edge was buffed. At test start, oysters were spaced equally and situated with their valve openings toward the flow of the circulator tube.

12. Reported Results:

DO : 90-100 %
pH : 7.6 - 8.0

Mean measured concentrations of Sencor ranged from 90-16 ppm (table 1, attached).

New shell growth was reduced by concentrations of Sencor $\geq$ 33 ppm. Oysters exposed to 16 ppm showed no reduction while oysters exposed to 90 ppm showed 100 % reduction (table 2, attached).

13. Study Author's Conclusions/Quality Assurance Measures:
96 hour EC_{50}: 52 ppm
95% Confidence Limits: 42-46 ppm.
NOEC: <33 ppm

A GLP statement complying with FIFR, 40 CFR part 160 was signed by the study director, Mr. Robert E. Bently. A quality assurance statement was included and a quality assurance audit was performed to ensure that the study was conducted in accordance with Good Laboratory Practice regulations and the protocols for individual laboratory studies.

14. Reviewer's Discussion:

A. **Test Procedure**-The test procedures were in accordance with Subdivision E and SEP guidelines with the following exceptions:

No raw data was submitted.

Either there was no adjustment period or no mention of an adjustment period between light and dark.

Temperature was monitored daily, not hourly as suggested by SEP guidelines.

B. **Statistical Analysis** No statistical analysis could be performed as the raw data was not submitted.

C. **Discussion of Results** The unconfirmed EC_{50} was 52 ppm, with a 95% confidence interval of 42-46 ppm.

The study author's NOEC was < 33 ppm.

The lack of adjustment period between light and dark and daily monitering of temperature rather than hourly, are not thought to have affected the results of the study as the control was subjected to the same treatment.

The results indicate that Sencor is slightly toxic to the Eastern oyster.

D. **Category of Study-** Supplemental

Rationale: Raw data is necessary for a statistical analysis to be performed.

Repairable: Yes, if raw data is submitted.

15. Completion of One Liner: Completed, August 13, 1991.

16. CBI Attachments: N/A

Metribuzin

Page_____ is not included in this copy.

Pages 8 through 9 are not included.

The material not included contains the following type of information:

____ Identity of product inert ingredients.

____ Identity of product impurities.

____ Description of the product manufacturing process.

____ Description of quality control procedures.

____ Identity of the source of product ingredients.

____ Sales or other commercial/financial information.

____ A draft product label.

____ The product confidential statement of formula.

✓ Information about a pending registration action.

✓ FIFRA registration data.

____ The document is a duplicate of page(s) _____.

____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

DATA EVALUATION REPORT

1. Chemical: Sencor/101101

2. Test Material: Technical;92.6% a.i.
white/grayish powder

3. Study Type: Sheepshead Minnow 96-hour static acute

4. Study Identification: Nicholson, Richard, and Suprenant, Donald C. Acute Toxicity of Sencor to Sheepshead Minnow (*Cyprinodon variegatus*). Study performed by Springborn Bionomics, Inc. 790 Main Street, Wareham, Massachusetts 02571 in March 1986 for Mobay Chemical Corporation, Stillwell, Kansas. MRID No. 470234-012. Toxicology Report No. 729. DP Barcode 166533 STUDY No. 91756.

5. Reviewed By:
Heather N. Mansfield, Zoologist
Ecological Effects Branch
Environmental Fate and Effects Division
Signature: Heather Mansfield
Date: 9/12/91

6. Approved by:
for Norman J. Cook, Head, Section 2
Ecological effects Branch
Environmental Fate and Effects Division
Signature: Allen W. Vaughan
Date: 9.12.91

7. Conclusions: This study has been reviewed and has been found to be scientifically sound. It does not, however, fulfill the requirements for an estuarine/marine fish study as the raw data was not submitted.

The reported results indicate that Sencor slightly toxic to the Sheepshead minnow.

The EC_{50} is 85 ppm, with a confidence interval of 60-102 ppm. The NOEC is 60 ppm.

8. Recommendations: EEB needs the raw data on mortality and effects of Sencor at all test concentrations in order to do a complete evaluation of this study.

9. Background: This study was reviewed as a part of the reregistration of Metribuzen.

10. Discussion of individual studies: N/A

11. Materials and Methods:

Test Material: Sencor
Test Organism: Sheepshead minnow
Source: Sea plantations, Salem Massachusetts.
Size (mean length): 22 mm (range of 17-25 mm)
(mean weight): .20 g (range of .07-.32

Acclimation: 14 days
Feeding: Fed commercial dry pelleted food ad libitum except for 48 hours prior to testing

Container: 19 L glass aquaria
Test Solution Volume: ≈ 15 L

Test dilution water: Seawater from Cape Cod Canal, Bourne, Massachusetts -- the water was filtered through a 5-μm porosity polypropylene core filter and an activated carbon canister
Preparation of solution: Prepared by adding the appropriate amounts of Sencor to 15 L seawater.
Nominal concentrations: 100, 60, 36, 23, 13, and 7.8 ppm.
Concentration: Measured day 0 and day 4
Salinity: 32 ppt
Temperature: 20 C±2
Photoperiod: 16:8 light (fluorescent):dark
Aerated: No

Control(s): Unfiltered sea water
Replicates: 2 per treatment level
Organisms per treatment level: 10 per replicate
Feeding: Unfed

12. Reported Results:

DO: 108 → 60% (with a low of 57%) for control; 108 → 58% (with a low of 57%) for all test groups
pH: 7.8 → 7.1 (control pH: 7.6 → 7.1)

Mean measured concentrations of Sencor ranged from 102 to 8.3 ppm (table 1, attached)

Mortalities occurred at 102 ppm

LD_{50} = 85 ppm

95% Confidence interval: 60-102 ppm

NOEL: 60 ppm

13. Study Author's Conclusions/Quality Assurance Measures:
96 hour EC_{50}: 85 ppm
95% Confidence Limits: 60-102 ppm.
NOEL: 60 ppm

A GLP statement complying with FIFR, 40 CFR part 160 was signed by the study director, Mr. Robert E. Bently. A quality assurance statement was included and a quality assurance audit was performed to ensure that the study was conducted in accordance with Good Laboratory Practice regulations and the protocols for individual laboratory studies.

14. Reviewer's Discussion:

A. **Test Procedure**-The test procedures were in accordance with Subdivision E and SEP guidelines with the following exceptions:

No raw data was submitted.

Either there was no adjustment period or no mention of an adjustment period between light and dark.

Although the average weight of the minnows was .20 g, some fish (how many is not ascertainable from the data provided) from the low end of the weight range were too small. SEP guidelines recommend a range of .1 - 5 g whereas the weight range of this study was 0.07 - .32 g.

The pH was too low, with a range of 7.6-7.1, rather than the 8 - 8.3 pH recommended by SEP guidelines.

An area of confusion exists under the study author's conclusions: it is stated that "No mortalities or adverse effects were observed among fish exposed to Sencor concentrations of < 60 mg/L. The NOEL for Sheepshead minnows exposed to sencor is 60 mg/L."

B. **Statistical Analysis** The LC_{50} (attached) was calculated by the binomial test using EPA's Toxanal computer program.

C. **Discussion of Results** The results indicate that Sencor is slightly toxic to the Sheepshead minnow.

The reported LC_{50} was 85 ppm, with a 95% confidence interval of 60-102 ppm. The reported NOEL was 60 ppm. Raw data is necessary for confirmation.

The low weight of some of the fish probably did not effect the results of the study

According to the cumulative data submitted, there were no mortalities or effects at 60 ppm (not at less than 60 ppm) as the study author reported. Again, the raw data is necessary to clarify this point.

The lack of adjustment period between light and dark is not thought to have affected the results of the study.

The pH was slightly low for saltwater, but likely not low enough to have effected the results of this study.

D. **Category of Study**-Supplemental

Rationale: Raw data is necessary for statistical analyses and clarification.

Repairable: Yes, if raw data is submitted.

15. Completion of One Liner: Completed, August 13, 1991.

16. CBI Attachments: N/A

Metribuzin

Page 14 is not included in this copy.

Pages _____ through _____ are not included.

The material not included contains the following type of information:

____ Identity of product inert ingredients.

____ Identity of product impurities.

____ Description of the product manufacturing process.

____ Description of quality control procedures.

____ Identity of the source of product ingredients.

____ Sales or other commercial/financial information.

____ A draft product label.

____ The product confidential statement of formula.

____ Information about a pending registration action.

✓ FIFRA registration data.

____ The document is a duplicate of page(s) _____.

____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

Addendum to the DER of the Acute Sheepshead Minnow Study MRID # 420945-02

Discussion

The raw data showed that there was no mortality neither physical of behavioral abnormalities in fishes at 60 mg/L treatment neither at lower concentrations. This observations confirmed the NOEL as 60 mg/L.

Classification of the study: Core

Conchi Rodriguez Sencor Acute Cypridon

****

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
102	20	17	85	.1288414
60	20	0	0	9.536742E-05
36	20	0	0	9.536742E-05
23	20	0	0	9.536742E-05
13	20	0	0	9.536742E-05
8.3	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT 60 AND 102 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 84.65261

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE
PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE
NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

****

Metribuzin

Page____ is not included in this copy.

Pages 17 through 18 are not included.

The material not included contains the following type of information:

____ Identity of product inert ingredients.

____ Identity of product impurities.

____ Description of the product manufacturing process.

____ Description of quality control procedures.

____ Identity of the source of product ingredients.

____ Sales or other commercial/financial information.

____ A draft product label.

____ The product confidential statement of formula.

__✓__ Information about a pending registration action.

__✓__ FIFRA registration data.

____ The document is a duplicate of page(s) _____.

____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.