Shaughnessy No.: 058001

Date Out of EAB: DEC 11 1987

To: D. Edwards/P. Jenkins
Product Manager # 12
Registration Division (TS-767)

From: Therese M. Dougherty, Chief
Environmental Chemistry Review Section 1
Exposure Assessment Branch
Hazard Evaluation Division (TS-769-C)

Attached, please find the EAB review of...

Req./File # : 3125-108

Chemical Name: Azinphosmethyl (GUTHION)

Type Product : Insecticide

Product Name : Action relates to all products with azinphosmethyl.

Company Name : Mobay Chemical Corp.

Purpose : Review photodegradation in water/soil submitted in response to registration standard.

Date Received: 9/18/87

Date Completed: DEC 11 1987

Action Code: 660

EAB #(s): 70971

Monitoring study requested: _____

Monitoring study voluntarily: _____

Total Reviewing Time: 3.0 days

Deferrals to: _____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

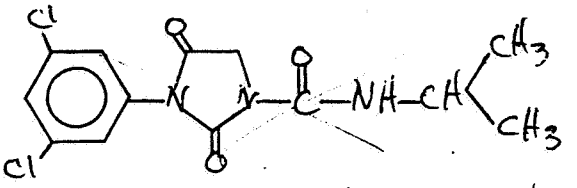
1. CHEMICAL:

Common Name- azinphos-methyl (Guthion*

Chemical Name- O,O-dimethyl-S-[4-oxo-1,2,3-benzotriazin-3(4H)-ylmethyl] phosphorodithioate

Trade Name- Not applicable.

Chemical Structure-



Wrong structure

2. TEST MATERIAL: Not applicable.

3. STUDY/ACTION TYPE: Mobay Chemical Corp. is submitting studies on photodegradation in water and on soil in support of the azinphosmethyl registration standard.

4. STUDY IDENTIFICATION:

- The Aqueous Photolysis of GUTHION-Phenyl-UL-^{14}C, J.G. Morgan, Report No. 94709, 14 July 1987, Acc. #4029701.
- The Photodegradation of GUTHION-Phenyl-UL-^{14}C on Soil, J.G. Morgan, Report No. 94708, 13 July 1987, Acc. #4029702.

5. REVIEWED BY:

Herbert L. Manning, Ph.D.
Microbiologist
EAB/HED

Signature: Herbert L. Manning
Date: DEC 11 1987

6. APPROVED BY:

Therese M. Dougherty, Chief
Section 1
EAB/HED

Signature: Therese M. Dougherty
Date: DEC 11 1987

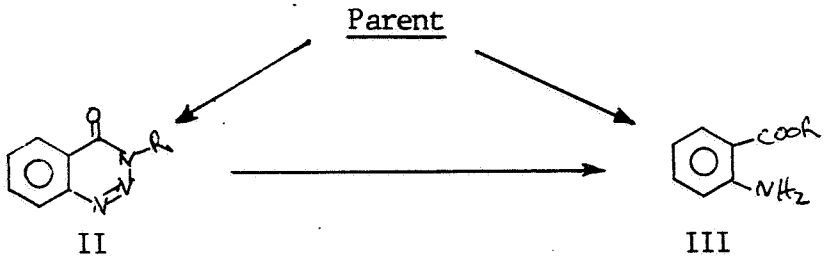
7. CONCLUSION:

EAB reviewed the aqueous/soil photodegradation studies submitted in support of the GUTHION (azinpohosmethyl) Registration Standard finds them acceptable.

and

A brief summary of the data is as follows:

- Photodegradation in water- Buffered solutions (pH 4.37) of ^{14}C-labeled GUTHION (10 ppm) were exposed to natural sunlight for varying periods up to 87 hours. The half-life for parent was 76.7 hours. Degradates were benzazimide (structure II below), which was 39.1% of applied at 87 hours, and anthranilic acid (structure III below), which leveled off at 7.2% at 56 hours.



II III

- Photodegradation on soil- GUTHION-phenyl-UL-^{14}C was applied at the maximum rate of 3 lb ai/A to sandy loam soil and exposed to natural sunlight for 4,8,16, and 31 days. Half-life of parent was 99 days. Six degradates were detected, but since all were less than 4% of applied, they were not identified.

8. RECOMMENDATION:

EAB finds the two photodegradation studies (aqueous and soil) acceptable in support of the GUTHION (azinphosmethyl) Registration Standard.

9. BACKGROUND:

A. Introduction

The studies Mobay submitted for review (photodegradation in water and on soil, Section 161-2 and 161-3, respectively) are in support of the azinphosmethyl (GUTHION) Registration Standard.

B. Directions for Use

See the previous review of 20 Nov 1980.

10a DISCUSSION OF INDIVIDUAL STUDY:

A. Study Identification- The Aqueous Photolysis of GUTHION-Phenyl-UL-^{14}C.

B. Materials and Methods- The details are attached. Briefly, they involved the following:

(a) Test material- Ten ppm of GUTHION-phenyl-UL-^{14}C (I) with a purity of 98.9%, as determined by HPLC. Material was dissolved in sterile 0.01 M pH 4 acetate buffer.

(b) Light source- Natural sunlight during Jan through Mar, 1987 in Kansas City, MO.

(c) Equipment- Test solution was contained and exposed to sunlight in fused quartz photolysis cells (Figure 2). Figure 3 shows a schematic diagram of the total apparatus during exposure.

(d) Sampling- Dark control and exposed samples were taken 4,5,8,32, 56, and 87 hours.

(e) Analyses- Liquid scintillation counting (LSC), High Pressure Liquid Chromatography (HPLC), and Mass Spectrometry (MS).

C. Results- Table I and Table II show analyses of dark control and exposed samples, respectively. Half-life of parent was 76.7 hours, as determined by regression analysis. Degradates were benzazimide (structure II), which was at 39.1% of applied at 87 hours, and anthranilic acid (structure III), which leveled off at 7.2% of applied at 56 hours. GUTHION (I) may degrade through II or be degraded directly to III (see Figure 1).

The pHs of the dark (control) and exposed samples were 4.39 and 4.37, respectively.

The temperature of the exposed solution ranged from 17.3 to 29.0°C and averaged 25°C. For the dark solution, the range was 18.1 to 28.1°C and averaged 24.8°C.

The material balance for the dark solution was 100.2%; for the exposed solution it was 99.8%.

D. Author's Conclusion- Aqueous solutions of GUTHION degraded in natural sunlight with a half-life of 76.7 hours yielding the degradates benzazimide and anthranilic acid.

E. Reviewer's Comments- By way of confirmation of the half-life they calculated for the parent, a regression analysis of the data (Table II) was done using a program developed in EAB. The program yielded a value of 73.7 hours, which is very similar to Mobay's value of 76.7 hours.

The study was well done and addressed all the parameters of our guidelines. EAB considers the study as acceptable in satisfying the data requirement in support of the standard.

10b DISCUSSION OF INDIVIDUAL STUDY:

A. Study Identification- The photodecomposition of GUTHION-phenyl-UL-^{14}C on soil.

B. Materials and Methods- The experimental details of the study are attached. Briefly, they consisted of the following:

(a) Test material- GUTHION-phenyl-UL-^{14}C (I) was applied to a 1mm thick soil layer at an application rate of 3 lb ai/A. Purity was 98.6%.

(b) Soil type- Sandy loam soil (see Table 1).

(c) Light source- Natural sunlight during Jan through April, 1987 in Kansas City, MO.

(d) Equipment- The soil photolysis module was a double-walled stainless steel tray fitted with a photodetector (see Figure 1 and text).

(e) Sampling- Dark and exposed samples were taken at 4,8,16, and 31 days.

(f) Analyses- LSC, HPLC, and GLC.

C. Results- Table II and III summarize the results of the analyses for the dark control and the exposed GUTHION, respectively. The calculated half-life (linear regressioin analysis) was 99 days. Recovery of parent was 80% of applied material. While six degradates were detected, all were less than 4% of the applied material at the end of 31 days.

For the exposed samples, the daytime maximum temperature was 34.2°C and the average was 17.7°C. For the control samples, the maximum was 27.4°C and the average was 17°C.

Recovery of total activity averaged 102.1%, with a range of 89.1-118.5%.

D. Author's Conclusions- Exposure of GUTHION to natural sunlight for 31 days on a sandy loam surface was slow ($t_{1/2}$ = 99 days), with none of the six degradates exceeding 4% of applied activity.

E. Reviewer's Comments- The study was well done and addressed all the parameters of our guidelines. EAB considers the study acceptable in satisfying this data requirement in support of the standard.

11. COMPLETION OF ONE-LINER:

This new information will be added to the GUTHION (azinphosmethyl) one-liner in our file.

12. CONFIDENTIAL APPENDIX:

Contains the cited Tables and Figures.

12. CONFIDENTIAL APPENDIX

Tables and Figures for:

- The Aqueous Photolysis of GUTHION-Phenyl-UL-^{14}C, J.G. Morgan, Report No. 94709, 14 July 1987, Acc. #4029701.

Azinphos-methyl

Page_____ is not included in this copy.

Pages 8 through 23 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.

X 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.