November 16, 78

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To: Product Manager Jacoby (2)
TS-767

Through: Dr. Gunter Zweig, Chief
Environmental Fate Branch

From: Review Section No. 1
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 239-2455

Chemical: Triforine (N,N'-[1,4-piperazinediylbis (2,2,2-Trichloroethylidene)] bis [formamide])

Type Product: Fungicide

Product Name: Ortho Triforine EC

Company Name: Chevron Chemical Company

Submission Purpose: added uses roses outdoor and asters, also change in rate for greenhouse roses

Date in: 11/8/78

Date out: 11/16/78

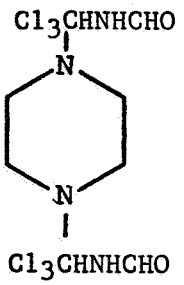
1.0 Introduction

1.1 Chemical Name: Triforine (N,N'-[1,4-piperazinediylbis (2,2,2 - trichloroethylidene)] bis [formamide])

1.2 Trade Name: ORTHO Triforine EC

1.3 Other Names: FMC 28221, Ortho XE359, Funginex, Cela W-524, CA-70203

1.4 Structural Formula:



1.5 The registrant proposes the added California use of Triforine on Asters and outdoor use on roses. An increase in application concentration (from 10-12 oz. ORTHO Triforine EC/100 gals. water to 12-16 oz. /100 gals. water) is proposed for greenhouse use on roses.

2.0 Directions for Use:

2.1 Roses - Greenhouse and Outdoor: Powdery Mildew - Apply 12 to 16 fl. oz. ORTHO Triforine EC(18.2 % a.i. by weight) per 100 gals. of water when disease first appears. Repeat every 7-10 days as necessary.

2.2 Asters (California only): Aster Rust - Apply 10 to 18 fl. oz. per 100 gals of water when disease first appears. Repeat every 7-14 days as necessary.

2.3 Precautions: Keep out of lakes, ponds and streams. Do not contaminate water by cleaning of equipment or disposal of wastes.

2.4 Disposal - Destroy container when empty. Do not reuse.

3.0 Discussion of Data

3.1 The following studies were referenced with this submission and have been previously reviewed in our evaluations dated 1/10/75, 8/19/75, 9/4/75, and 1/27/76.

Soil Studies

1. Degradation of Cela W-524 (Triforine) in Various Soil Types. Dr. D. C. A. Elichler, Plant Protection

Department, Ana. ical Chemistry, C. H. Boehring Sohn, Ingelheim/Rhein, West Germany, November 5, 1971. Triforine 20% EC.

Soil Degradation of Triforine - Additional Data, submitted by E.M. Laboratories, Inc. August 1, 1975.

2. Soil Degradation of Triforine, D. M. Munger, FMC Agricultural Chemical Division, Middleport, New York. May 10, 1974. Technical Triforine ($^{14}C/^{3H}$-Labeled).

3. Leaching Studies on Cela W 524 (Triforine) in Various Soil Types, Dr. D. C. A. Eichler, Plant Protection Department, Analytical Chemistry, C. H. Boehringer Sohn, Ingelheim/Rhein, West Germany. August 15, 1972. Triforine 20% EC.

4. Leaching of ^{3}H-Triforine Residues in Cosad Sandy Loam Soil, Dr. R. A. Robinson, FMC Agricultural Chemical Division, Middleport, New York, May 13, 1974. Triforine Technical (^{3}H-Labeled).

5. Influence of Cela W 524 (Triforine) on the Aerobic Activity in the Soil, Dr. G. Muacevik, Pharma Research Biology, Department of Pharmacology, C. H. Boehringer Sohn, Ingelheim/Rhein, West Germay. August 28, 1972. Triforine Technical and Triforine 20% EC.

6. Investigations Into the Effects of Saprol (Triforine 20% EC) on Soil Organisms, Dr. K. H. Domsch, Institute of Soil Biology, Braunschweigh, West Germany, May 22, 1973. Triforine 20% EC.

Hydrolysis Studies

1. Stability of Cela W 524 in Solution at Room Temperature, Dr. W. Ost, Pesticide Research Chemical Section, C. H. Boehringer Sohn, Ingelheim/Rhein, West Germany, August 12, 1971. Triforine Technical. EPA Registration Number 21137-4, Submitted December 30, 1975, Accession Number 224103.

2. The Decomposition of Triforine in Aqueous Solution by U.V. Radiation, Dr. W. Ost. Chemical Research, Celamerck, Ingelheim, West Germany. January 3, 1974. Triforine Technical. EPA Registration Number 21137-4, Submitted December 30, 1975, Accession Number 224103.

3. Comparative Radio Thin Layer Chromatographic Investigations of the Decomposition of $^{3H/14C}$ - W 524 (Triforine) in Aqueous Solution, Dr. S. Darda, C. H. Boehringer Sohn, Ingelheim, West Germany. March 1973. Triforine Technical. EPA Registration Number 21137-4, Submitted December 30, 1975, Accession Number 224103.

4. Decomposition Products of Radioactive Triforine (W524) in Aqueous Solution, Dr. S. Darda, C. H. Boehringer Sohn, Ingelheim, West Germany. February 18, 1974. Triforine Technical. EPA Registration Number 21137-4, Submitted December 30, 1975, Accession Number 224103.

5. Rate of Hydrolysis of Triforine in Aqueous Solutions, Dr. D. Eichler, Analytical Laboratory, C. H. Boehringer Sohn, Ingelheim, West Germany. November 1, 1975. Triforine Technical. EPA Registration Number 21137-4, Submitted December 30, 1975. Accession Number 224103.

6. Rate of Hydrolysis of Triforine in Aqueous Solutions at 5° C; Dr. D. Eichler, Analytical Laboratory, C. H. Boehringer Sohn, Ingelheim, West Germany. November 21, 1975. Triforine Technical. EPA Registration Number 21137-4, Submitted December 30, 1975, Accession Number 224103.

7. Correlation Between Various Results of Tests on the Degradation of Triforine in Water, Dr. D. Eichler, Celamerck, Ingelheim, West Germany. November 4, 1975. EPA Registration Number 21137-4, Submitted December 30, 1075, Accession Number 224103.

Photodegradation Effects

1. Investigations Into the Decomposition of Triforine on Exposure to Light, Dr. D. Eichler, Celamerck, Ingelheim, West Germany. January 30, 1974. Triforine Technical.

2. Studies of the Influence of Light on the Degradation of Cela W 524 (Triforine), Dr. D. C. A. Eichler, Plant Protection Department, Analytical Chemistry, C. H. Beohringer Sohn, Ingelheim/Rheim, West Germany. September 6, 1972. Triforine 20% EC.

Fish Accumulation Studies

1. Tritium/Carbon - 14 - Triforine Residues in Fish, Triforine Environmental Impact Report, Ref #16, Feb. 1975, 7F1921, EPA Registration No. 21137-4, Accession No. 095811, pg. 37.

3.2 No new data were submitted with this submission.

4.0 Recommendations

4.1 Directions for use indicate that the proposed outdoor use is not limited to domestic outdoor use.

Thus, we do not know the environmental fate of Triforine.

An effects on microbes study is needed to support this non-crop use which is an outdoor use.

4.2 A volitility study will be required to support the proposed increase in application rate for greenhouse use.

4.3 Acceptable protocols for these studies can be found in the Guidelines published in the Federal Register July 10, 1978.

Ronald E Ney Jr 11/27/78

Paul W. Davis

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Review Section #1
EFB - HED