

US EPA ARCHIVE DOCUMENT

Shaughnessy Number: 81901

Date out of EFGWB: JUL 12 1989

To: Lois Rossi/Mario Fiol
Product Manager 21
Registration Division (H7505C)

From: Emil Regelman, Supervisory Chemist
Environmental Fate Review Section #2
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division (H7507C)

Thru: Hank Jacoby, Acting Chief
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division (H7507C)

Attached, please find the EFGWB review of...

Reg./File #: 50534-7

Chemical Name: Chlorothalonil

Type Product: fungicide

Product Name: n.a.

Company Name: Fermenta

Purpose: submission of aqueous and soil photolysis data

Date Received: 4/17/89

Action Code: 300

EFGWB#(s): 90529, -30, -31

Total Reviewing Time (decimal days): 2

Deferrals to: Ecological Effects Branch, EFED

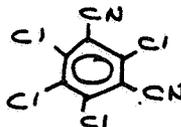
Science Integration and Policy Staff, EFED

Non-Dietary Exposure Branch, HED

Dietary Exposure Branch, HED

Toxicology Branch

CHL90529 1.1

1. CHEMICAL:
chemical name: 2,4,5,6-tetrachloroisophthalonitrile
common name: chlorothalonil
trade name: daconil
structure: 
CAS #: 1897-45-6
Shaughnessy #: 081901

2. TEST MATERIAL: n.a.

3. STUDY/ACTION TYPE:

support of previous submissions of aqueous and soil photolysis data

4. STUDY IDENTIFICATION:

Response to Agency comments on the following:

Nelson, T.R. An Aqueous Photolysis Study with ¹⁴C-2,4,5,6-Tetrachloroisophthalonitrile (Chlorothalonil). SDS-2787. performed by Ricerca, Inc, Painesville, OH; sponsored by Fermenta Plant Protection Co., Mentor, OH. dated 4/10/87. received EPA under MRID# 40183418

Nelson, T.R. Photodegradation and Mobility of Daconil and its Major Metabolite on Soil Thin Films. submitted by Fermenta Plant Protection Co., Mentor, OH. received EPA under MRID# 00156470

5. REVIEWED BY:

Typed Name: E. Brinson Conerly
Title: Chemist, Review Section 2
Organization: EFGWB/EFED/OPP

E.B. Conerly 7/11/89

6. APPROVED BY:

Typed Name: Emil Regelman
Title: Supervisory Chemist, Review Section 2
Organization: EFGWB/EFED/OPP

Emil Regelman
JUL 12 1989

7. CONCLUSIONS:

Although the studies were done under non-Guidelines conditions, they indicate that photolysis is not a major degradative pathway for chlorothalonil. Extrapolated half-life for aqueous photolysis is ca. 68 days. Approximately 87% of parent remained after 168 days exposure on soil. Little would be gained by requiring repeat studies. However, if significant photodegradation had taken place, the studies would almost certainly have been unacceptable, since they could not have been interpreted against studies in which "natural conditions" were simulated on other chemicals.

8. RECOMMENDATIONS:

The applicant should be informed that the requirements for aqueous and soil photolysis data are fulfilled and should note that this acceptance is not intended to encourage the submission of non-Guidelines studies.

BACKGROUND:

Available data depict a compound which is stable to hydrolysis and photolysis, but susceptible to metabolism under most conditions. Parent or degradates may leach.

The status of data requirements is as follows:

discussed in this review:

photolysis in water -- (required per 1988 draft registration standard)

soil photodegradation -- (required per 1988 draft registration standard)

additional data required:

terrestrial field dissipation -- (1988 draft registration standard)

aerobic soil metabolism -- MRID #s 00029407 and 00087351 were recently cited by the applicant and reviewed in EBC 4/12/89. MRID 00029407 should not have been accepted in 1984 because, as noted at that time, it lacked satisfactory material balance and rate of degradation. The study simply identified products isolated at one sampling time in a single soil type after repeated doses of parent compound. MRID 00087351 established half-lives for parent compound in four other soils, not used in MRID 00029407. It identified some, but not all, of the degradates which were detected. The two studies have no common points of reference, and do not constitute a complete study when taken together.

fish bioaccumulation -- (1988 draft registration standard)

fulfilled:

hydrolysis -- (1988 draft registration standard), stable at pH 5 and 7; 10% degraded in 30 days at pH 9, with 2,4,5,6-tetrachloroisophthalimide as the only degradate

anaerobic soil metabolism -- (1988 draft registration standard) by submission of an acceptable anaerobic aquatic metabolism study

anaerobic aquatic metabolism -- (1988 draft reg std.) -- a half-life of 5-15 days producing 4-hydroxy-2,5,6-trichloroisophthalo-nitrile, 3-cyano-2,4,5,6-tetrachlorobenzamide, 2-hydroxy-5-cyano-3,4,6-trichlorobenzamide, and 3-carboxy-2,5,6-trichlorobenzamide

leaching/adsorption/desorption -- the data in the study were misinterpreted in the original review, when K_d s -- 26 for silty clay loam, 29 for silt, 20 for sandy loam, and 3 for sand -- were evaluated on a scale used for K_{oc} s. Correctly assessed, these values indicate that chlorothalonil should not be highly mobile (except possibly in sand). However, actual findings in ground water require field monitoring studies.

confined accumulation on rotational crops -- (1988 draft registration standard)

• field accumulation on rotational crops -- tolerances needed

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

aqueous photolysis

In the previous review, EFGWB questioned the following:

- 1) whether chlorothalonil absorbance spectra in water (which had been not been included in the report) and that in ethanol (which had been) were similar
- 2) why the exposure periods appeared to be irregular
- 3) whether the applicant believed that the experimental conditions were more severe than exposure to natural light

The applicant presents the following clarifications:

- 1) absorbance spectra of chlorothalonil in water and ethanol are virtually identical
- 2) exposure intervals were short initially to allow for frequent sampling, and were lengthened when little or no photolysis was observed.
- 3) the exposure conditions were a more severe test of the compound's lability than natural sunlight, since each hour of exposure was equivalent to 4 hours of noontime sunlight.

soil photolysis

The applicant contends that the subject study should be acceptable, since even under these "extreme" conditions, photolysis did not occur

11. COMPLETION OF ONE-LINER: attached

12. CBI APPENDIX: n.a.

ENVIRONMENTAL FATE AND GROUND WATER BRANCH
PESTICIDE ENVIRONMENTAL FATE ONE-LINER

File No.: 081901 CAS No.: 1997-45-6
 Type Pesticide: fungicide
 Chemical Name: Chlorothalonil; 2,4,5,6-tetrachloroisophthalonitrile
 Empirical Form: $C_8N_2Cl_4$
 Uses: to control fungal foliar diseases of vegetable and ornamental crops; wood protectant; antimold and mildew
 Form. Type: dust, granular, WP, WP dust, impregnated, dry flowable, EC, flowable concentrate, liquid RTU

Mole Wt. 195.01 Sol. @20 C (ppm) 0.6 Vap. Pres. (torr) 8.05×10^{-7} Log K_{ow} Henry

Hydrolysis (161-1)
 pH 5: **stable for 30 days
 pH 7: **stable for 30 days
 pH 9: **10% degraded in 30 days
 Photolysis (161-2, -3, -4)
 Water: ** $t_{1/2}$ 68 days
 Soil: ** ca. 87% parent remained after 168 days
 Air:

Soil Metabolism Studies - Terrestrial

Aerobic (162-1)
 1 # silt loam
 non-sterile - $t_{1/2}$ 36.5 d
 "sterile" - $t_{1/2}$ 213.8 d
 # loam
 non-sterile - $t_{1/2}$ 14.7 d
 "sterile" - $t_{1/2}$ 31.3 d
 # sandy loam (TX)
 non-sterile - $t_{1/2}$ 12.8 d
 "sterile" - $t_{1/2}$ 18.0 d
 # sandy loam (OH)
 non-sterile - $t_{1/2}$ 10.3 d
 "sterile" - $t_{1/2}$ 21.9 d

Anaerobic (162-2)
 ** satisfied by anaerobic aquatic study

Soil Metabolism Studies - Aquatic

Anaerobic (162-3)
 ** silt loam - $t_{1/2}$ ca 9 d -- reaction is probably non-first-order, log plot is non-linear
 ** sandy loam - $t_{1/2}$ ca 10 d -- reaction is probably non-first-order, log plot is non-linear

Mobility Studies (163-1)

Soil Partition (K_d) Rf factors
 1 **silty clay loam - 26
 **silt - 29
 **sandy loam - 20
 **sand - 3

Field Dissipation Studies

Terrestrial (164-1) Aquatic (164-2)

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Field Dissipation Studies
Forest (164-3)

Other

Ground Water Findings

Rotational Crop Restrictions (165-1, -2)

- 1 ** confined -- residues detected
- 2 ** field -- residues detected, tolerance setting required

Fish Accumulation Studies (165-4)

Degradation Products

- 1 ** 2,4,5,6-tetra Cl isophthalonitrile -- hydrolysis at pH 9
- 2 ** 4-OH-2,5,6-tri Cl isophthalonitrile -- anaerobic flooded soil
- 3 ** 3-cyano-2,4,5,6-tetra Cl benzamide -- anaerobic flooded soil
- 4 ** 2-OH-5-cyano-3,4,6-tri Cl benzamide -- anaerobic flooded soil
- 5 ** 3-carboxy-2,5,6-tri Cl benzamide -- anaerobic flooded soil

Notes

References: 1984 Reg Std, 1988 Reg Std, EBC 7/11/89
Writer: EBC 7/11/89

- ** EPA Acceptable Study
- # Supplemental (Scientifically Sound) Information)

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