Shaughnessy Number: 81901

Date out of EFGWB: APR 12 1989

To: Donna Williams
Review Manager
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: comments on draft Registration Standard

Date Received: 2/1/89

Action Code: 350

EFGWB#(s): 90322

Total Reviewing Time (decimal days): 6

Deferrals to: ___Ecological Effects Branch, EFED

___Science Integration and Policy Staff, EFED

___Non-Dietary Exposure Branch, HED

___Dietary Exposure Branch, HED

___Toxicology Branch

CHL90322 1.1

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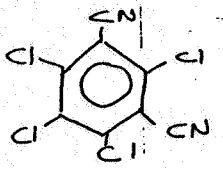
4/6/89 4/8 P.5

1. CHEMICAL:

chemical name: 2,4,5,6-tetrachloroisophathalonitrile
common name: chlorothalonil
trade name: daconil
structure:



CAS #: 1897-45-6
Shaughnessy #: 081901

2. TEST MATERIAL: n.a.

3. STUDY/ACTION TYPE: comments on draft Registration Standard

4. STUDY IDENTIFICATION: n.a.

5. REVIEWED BY:

E.B. Conerly 4/12/89

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

6. APPROVED BY:

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

APR 12 1989

7. CONCLUSIONS:

Monitoring studies are required because of reports that chlorothalonil has actually been detected in ground water, indicating that it, or its degradates, leaches. It is true that EFGWB originally used an inappropriate scale of values in interpreting the leaching/adsorption/desorption data. Reevaluation on the correct scale shows that, theoretically, chlorothalonil should not be a leacher. The monitoring studies will help to resolve these conflicting data, by establishing the extent and magnitude of leaching under well-defined conditions in the field. EFGWB has not reviewed the aquatic field study cited by the registrant. It should be submitted for review by this branch if it is to be used as evidence of low leachability.

The aerobic metabolism data discussed below do not represent a complete, acceptable study. This data requirement is still unfulfilled.

Aqueous and soil photodegradation data are still required.

8. RECOMMENDATIONS:

See the ground water team evaluation attached to this review. Chlorothalonil can not be removed from the list of chemicals of concern for potential ground water contamination unless monitoring data demonstrate that the compound and its degradates are not leachers under field conditions.

The applicant must provide an acceptable aerobic soil metabolism study according to Guidelines subpart N, establishing the patterns of disappearance of parent, appearance and disappearance of degradates, and identity of degradates.

The registrant should submit any additional information re aqueous and soil photolysis for EFGWB review.

9. BACKGROUND:

The applicant has commented on the draft 1988 Registration Standard in two documents, a letter summary dated 11/16/88, and a detailed response dated 12/27/88. These documents discuss aerobic soil metabolism and leaching/adsorption/desorption studies and cite studies on aqueous photolysis and soil photolysis which the applicant believes should satisfy these four data requirements.

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:

hydrolysis -- fulfilled (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

photolysis in water -- additional data required (1988 draft registration standard) -- the previous study could be made acceptable

soil photodegradation -- required (1988 draft registration standard)

aerobic soil metabolism -- discussed in this review

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

anaerobic aquatic metabolism -- fulfilled (1988 draft reg std.) -- a half-life of 5-15 days producing 4-hydroxy-2,5,6-trichloro-isophthalonitrile, 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 -- discussed in this review.

terrestrial field dissipation -- additional data required per the 1988 draft registration standard

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

field accumulation on rotational crops -- fulfilled, tolerances needed

fish bioaccumulation -- additional data required per the 1988 draft registration standard

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES: n.a.

In submissions dated 11/16/88 and 12/27/88, the registrant, Fermenta, discusses the following items in the draft Registration Standard:

1) the Agency's position that the aerobic soil metabolism data requirement is unfulfilled

the registrant -- when MRID 00029407, the aerobic soil metabolism study accepted for the 1984 registration standard, is put together with MRID 00087351, in which material balance and degradate identification is sufficiently complete, the data requirement should be considered fulfilled.

EFGWB -- 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 isolated the products 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 soils, none of which are the soil 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.

2) leaching/adsorption/desorption data, which an Agency review said indicated a high degree of mobility in several soils

the registrant -- "Based on the mobility scale for K_{oc} developed by Swann, Laskowski, McCall, VanderKuy and Dishburger, the correct classification for chlorothalonil mobility would be ranging from low mobility to immobile."

They state that an aquatic field study (not included) showed that run-off water in a pond did contain some soil bound compound. They argue that, despite this finding, the pond did not deteriorate, since chlorothalonil did not persist or accumulate. [i.e., The registrant believes that even if some movement may have occurred, it didn't cause a problem -- EBC]

EFGWB -- Because chlorothalonil has been found in ground water, the requirement for ground water monitoring data remains in effect. These studies will help to resolve the existing conflicts within the various data EFGWB now has.

The leaching/adsorption/desorption study was misinterpreted in the original review. K_Ds -- 26 for silty clay loam, 29 for silt, 20 for sandy loam, and 3 for sand -- were evaluated on a scale which should be used for K_{oc}s. Correctly assessed, these values indicate that chlorothalonil should not be highly mobile (except possibly in sand). However, KDs are only a single parameter.

The aquatic field study on run-off is not part of EFGWB records, and does not necessarily reinforce the registrant's position. It should be submitted for review if the registrant wishes it to be considered as evidence of non-leaching.

Other data requirements were mentioned in the registrant's comments by reference, but no discussion was included.

1) The registrant cites an aqueous photodegradation study (MRID 40183418) which EFGWB has said might be made acceptable with additional information. EFGWB will review the requested information when received, and reevaluate the status of this requirement at that time.

2) The registrant cites two soil photodegradation studies (MRID 00040541 and MRID 00156470). When examined, the first study turned out to be a report on a soilless thin layer photodegradation, and the second was a discussion of an EAB (now EFGWB) review of a soil photodegradation study. Without the correct citation for the original soil photodegradation study, EFGWB is unable to reconsider the status of this data requirement.

11. COMPLETION OF ONE-LINER: attached

12. CBI APPENDIX: n.a.

Date: July 28, 1988

Note to: Mario Fiol

From: Michael R. Barrett
Exposure Assessment Branch
HED/OPP

Subject: Occurrence of Chlorothalonil in Ground Water

Chlorothalonil has been detected, to our knowledge, in only two locations (Suffolk County, Long Island, New York; and Cape Cod, Massachusetts). Both locations have extremely vulnerable ground water, therefore these findings are not, in and of themselves, an indication that chlorothalonil has a high potential to leach to ground water. Laboratory studies indicate that chlorothalonil per se is of low to intermediate persistence, and is only likely to extensively leach in sandy soils. However, some of its degradates, such as 3-carboxy-2,5,6-trichlorobenzamide may be quite mobile in medium textured soils (cf. review of soil column leaching study in the Environmental fate chapter). If such degradates are determined by the Toxicology Branch to be of toxicological concern, then additional data are required to determine the extend of the ground-water contamination hazard from leaching of chlorothalonil degradates. The additional soil metabolism studies and field dissipation studies required must determine the persistence and, for field studies, mobility of the important metabolites of chlorothalonil.

Michael R. Barrett

April 6, 1989

Note:

To: Brinson Conerly C.E.D

From: Catherine Eiden

Chlorothalonil has been detected in ground water in NY, MA, ME and California according to our records in the Pesticides in Ground Water Data Base, 1988 Interim Report.

NY	67/11	SFU
MA	59/2	NFU
ME	159/1	SFU
CA	point-source	

The above chart (taken from the data base) can be interpreted as follows:

In NY, 11 out of 67 samples analyzed for Chlorothalonil were confirmed as positive, resulting from suspected field use.
In MA, 2 out of 59 samples analyzed for chlorothalonil were positive, resulting from normal field use.
In ME, 1 out of 159 samples were confirmed as positive, resulting from suspected field use.
In CA, detections of chlorothalonil were traced to point sources or illegal uses.

For your review, you may want to include this information, and Michael Barrett's brief summary on the OPP's assessment of chlorothalonil's leaching potential. It should not be removed from a "list of concern" for ground water at this time.

(7)

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

File No.: 081901 CAS No.: 1897-45-6
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.	Sol. @20°C (ppm)	Vap. Pres.(torr)	Log K_{ow}	Henry
195.01	0.6	8.05×10^{-7}		

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: # relatively stable
Soil: # relatively stable
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)
1 **silty clay loam - 26
**silt - 29
**sandy loam - 20
**sand - 3

Rf factors

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
Writer: EBC 3/30/89

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