Shaughnessy No.: 129016 (2/12/92)

Date out of EFGWB: JUN 22 1990

TO: J. Miller/R. Ikeda
Product Manager #23
Registration Division (H7507C)

FROM: Emil Regelman, Supervisory Chemist
Chemistry Review Section #2
Environmental Fate and Ground Water Branch

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

Attached, please find the EFGWB review of ...

Reg./File #: 464-EUP-RNG

Chemical Name: N-(2,6-difluorophenyl)-5-methyl-1,2,4-triazolo[1,5a] pyrimidine-2-sulfonamide

Type Product: Herbicide

Common Name: XRD-498

Company Name: Dow Chemical USA

Purpose: Addendum to application for corn and soybean Experimental Use Permit

Date Received: 9 May 1990 Date Completed: 21 May 1990

Action Code: 701

EFGWB #(s): 90-0548

Total Reviewing Time: 1.1 days

Deferrals to: ___Ecological Effects Branch, EFED

___Science Integration and Policy Staff, EFED

___Non-Dietary Exposure Branch, HED

___Dietary Exposure Branch, HED

___Toxicology Branch

1. CHEMICAL:

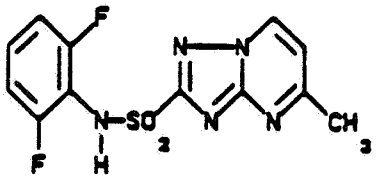
Chemical name: N-(2,6-difluorophenyl)-5-methyl-1,2,4-triazolo[1,5a] pyrimidine-2-sulfonamide

CAS no.: 98967-40-9

Common name: XRD-498

Trade name: DR-0238-5651/K-170,711

Chemical structure:



Molecular formula: $C_{12}H_8F_2N_5O_2S$

Molecular weight: 325.3

Formulation: N-(2,6-difluorophenyl)-5-methyl(1,2,4)triazolo[1,5a] pyrimidine-2-sulfonamide.....74.9%
Inert Ingredients.....25.1%

Physical/Chemical properties of active ingredient:

Physical characteristics: Light tan power

Melting point: 253°C

Vapor Pressure: 0.8 X 10^{-15} mm Hg at 20°C

Solubility: 49.1 mg/l at pH 2.5 (25°C)
5.65 g/l at pH 7.0 (25°C)

Octanol/water partition coefficient: Kow = 1.62

2. TEST MATERIAL:

Active ingredient

3. STUDY/ACTION TYPE:

Addendum to application for corn and soybean Experimental USe Permit.

4. STUDY IDENTIFICATION:

Laskowshi, D., Lehmann, R., Goodwin, P., Stanley, D., French, B., and Miller, J. AEROBIC SOIL DEGRADATION OF XRD-498. Sponsored and Submitted by Dow Chemical Company USA, Midland, MI under Laboratory Project ID GH-C 2160; Received by EPA 28 September 1989; MRID No. 41263230.

Lehmann, R., Laskowski, A., Miller, J., Stanley, D., and Fontaine, D. EFFECT OF SOIL PROPERTIES ON THE DEGRADATION AND SORPTION OF XDR-498. Sponsored and Submitted by Dow Chemical Company USA under Laboratory Project ID GH-C 2243 and Protocol No. 87062; Received by EPA 28 September 1989; MRID No. 41290403.

Goodwin, P., Lehmann, R. and Miller, J. SOIL ADSORPTION/DESROPTION OF ^{14}C-XRD-498. Sponsored and Submitted by Dow Chemical Company USA, Midland, MI under Laboratory Project ID GH-C 2159; Received by EPA 28 Sept. 1989; MRID No. 41263231.

Hamburg, A., Miller, J.H., Lardie, T.S., and Baldwin, W.S. ^{14}C-XRD-498: CONFINED ACCUMULATION STUDY ON ROTATIONAL CROPS PLANTED AT 30 AND 120 DAYS AFTER SOIL TREATMENT. Sponsored and Submitted by Dow Chemical Company USA, Midland, MI under Laboratory Project ID GH-C 2170; Received by EPA 28 September 1989; MRID No. 41263232.

5. REVIEWED BY:

Gail Maske
Chemist, Review section #2
OPP/EFED/EFGWB

Signature: [signature]
Date: 17 May '90

6. APPROVED BY:

Emil Regelman
Supervisory Chemist
Review section #2
OPP/EFED/EFGWB

Signature: [signature]
Date: JUN 22 1990

7. CONCLUSIONS:

The environmental fate data ~~is~~ ARE not adequate to support the proposed Experimental Use Permit (EUP) for use on corn and soybeans. The aerobic soil metabolism and the leaching,adsorption/desorption studies are still data gaps.

EFGWB concurs with the requested waiver of the accumulation in fish study. XRD-498 is not expected to accumulate in fish due to its low octanol/water coefficient (1.62).

The phenyl-labelled [^{14}C]XRD-498 aerobic soil metabolism study is nearing completion and will be submitted this year.

A new confined accumulation-rotational crop study is being conducted in support of full registration. Because the XRD-498 label for the EUP will contain crop destruct, the confined rotational crop study is not required for support of the EUP.

8. RECOMMENDATIONS:

The requested EUP should be resubmitted to EFGWB when data addressing the existing gaps ~~is~~ 4KE received.

9. BACKGROUND:

General Background

XRD-498 is a selective herbicide proposed for use to control broadleaf weeds in soybeans and field corn. The single active ingredient formulations is 75% G. XRD-498 may be applied using preplant incorporation, preemergence, or postemergence treatment. Proposed application rates are 0.03-0.13 lb ai/A for preplant incorporation and preemergence treatment; postemergence rates on field corn are 0.015-0.062 lb ai/A, and postemergence rates on soybeans are 0.0078-0.015 lb ai/A. Application is by ground spray; sufficient agitation should be maintained during mixing and spraying to ensure a uniform spray mixture. When applied by preplant incorporation, XRD-498 should be incorporated into the top 2 to 3 inches of the final seedbed. Preemergence and postemergence applications are made by broadcast spraying. Livestock should not be allowed to graze in treated areas, and harvest-treated silage or grain should not be fed to meat or dairy animals.

Environmental Fate Background

Degradation

[^{14}C]XRD-498 did not hydrolyze in sterile aqueous pH 5, 7, 9 buffered solutions incubated in the dark at 25°C for 66 days. [^{14}C]XRD-498, present in all solutions at $\geq$ 99%, was the sole compound identified in the buffer solutions at all sampling intervals.

Metabolism

5-Triazolopyrimidine-labelled [^{14}C]XRD-498 degraded with half-lives of 23, 60, 93, 102 days in sandy loam, clay, silt loam, and loam soils, respectively. Six unidentified degradates were each isolated at up to 3.4% of the applied [^{14}C]XRD-498. At 371-382 days posttreatment $^{14}CO_2$ comprised 34.5 - 53.3% of the applied radioactivity. An aerobic soil metabolism study of the phenyl-labelled [^{14}C]XRD-498 is required to fulfill the data requirement for registration.

Mobility

[^{14}XRD-498 was determined to be very mobile in twenty-three soils ranging in texture from sandy loam to clay. The adsorption coefficients (K_d) were 0.05 to 2.42, and K_{oc} values were 5 to 182. It appeared that adsorption increased with decreasing pH, with increasing half-life, and with increasing soil organic matter content. Freundlich K_{doc} values were determined to be 0.15 to 0.57, and corresponding K_{oc} values were 14 to 25 in silt loam, sandy loam, clay, and loam soils. Mobility of degradates have not been addressed.

Accumulation in Rotational Crops

Samples were analyzed only for total [^{14}C]XRD-498 residues. Total [^{14}C] XRD-498 residues were found at low levels (<0.01 ppm XRD equivalents) in lettuce, carrot roots and tops, and soybean beans planted 30 to 52 or 120 days after plots of sandy loam soil were treated with [^{14}C]XRD-498. Total [^{14}C]XRD-498 residues were 0.010-0.047 ppm in green bean plants, wheat grain, and wheat straw/chaff planted at the 30 day rotational, and in soybean plant trash and wheat straw/chaff planted at 120 days.

In the 0 to 15 cm soil depth samples, total [^{14}C]residues were 0.066 ppm at 30 days posttreatment, 0.019 ppm at 105 days, and 0.014 ppm at 208 days. Extractable [^{14}C]residues accounted for 0.035 and 0.003 ppm at 30 and 118 days posttreatment.

10. DISCUSSION:

In response to the 2 February 1990 (WGM) review of a request for an Experimental Use Permit (EUP) for XRD-498, DowElanco addressed each item on a point-by-point basis.

ITEM 1:

The environmental fate data are not adequate to support the proposed EUP. New studies are needed to support the mobility, accumulation in rotational crops, and accumulation in fish.

A. Leaching, adsorption/desorption mobility study:

a. Two leaching, adsorption/desorption mobility studies were submitted (MRID No. 41290403 and MRID No. 41263231). Each deficiency addressed in the leaching, adsorption/desorption mobility study (MRID No. 41290403) was discussed in detail by DowElanco. However, these details did not change the status of the deficiencies or the acceptability of the study. The Leaching, adsorption/desorption study (MRID No. 41290403) is not acceptable to meet Subdivision N Data Requirement, due to deficiencies addressed in the review 2 February 1990 (WGM).

b. In the study (MRID 41263231), the experimental design was not adequate to accurately determine the actual desorption of XRD-498 and its degradates.
DowElanco's Response:

"The XRD-498 desorption method was in exact agreement with one of two methods specified by EPA for conducting aged desorption studies. As quoted from the Pesticide Assessment Guidelines, Subdivision N, Chemistry: Environmental Fate, Series 163-1, Leaching and Adsorption/Desorption Studies, Addendum 6 on Data Reporting (dated Jan. 1988), page 4, response to comment #3: "The aging refers to the pesticide in the soil. The test pesticide may be applied to the soil, aged, extracted, and adsorption/desorption testing done on the extract; or, alternatively, applied to the soil, aged, and the batch adsorption/desorption done.

The XRD-498 desorption studies were done using the second of these two methods: The pesticide was applied to the soil, aged, and the batch adsorption/desorption was done. In denying this method, the Dynamac reviewer is denying a method which has been published by the EPA, and recommended by the EPA.

The decision by the EPA to recommend this method was a good one because it is a highly realistic measure of the mobility of a compound. The method allows the pesticide to adsorb to the soil in the same fashion as in the field, and it allows the pesticide to age and produce degradates in the same fashion as in the field. Then when the aqueous (0.01 M $CaCl_2$) solution is added, this simulates a "worst-case" scenario of an enormous rainfall. The desorption constants that result are thus interpreted as measures of the maximum potential for leaching.

This method is especially effective when the desorption constants are obtained from the same soil samples that were incubated in the aerobic soil study. This allows the two major laboratory studies-aerobic soil and mobility-to be linked together, providing a one to one correspondence between the degradation behavior of a pesticide and its mobility.

EFGWB's Response:

The leaching, adsorption/desorption study (MRID No. 41263231) is partially acceptable to meet Subdivision N Data Requirement. Leaching, adsorption/desorption data is still needed on degradates.

B. Confined accumulation-rotational crop study:

DowElanco's Response:

"A new confined accumulation-rotational crops study is being conducted. A meeting with the Agency has been requested to determine the acceptability of the submitted study for only EUP purposes. Some storage stability data will be presented to support this request."

EFGWB's Response:

Since the EUP label for XRD-498 will have crop destruction as a requirement, EFGWB feels the confined accumulation-rotational crops study is not required to support the data requirement for the EUP.

C. Accumulation in Fish:

DowElanco's Response:

"With regard to accumulation in fish, the registrant's position is that a study is not needed for either the EUP or full registration. The basis for this position is that the octanol/water partition coefficient for XRD-498 is 1.62 and the water solubility is 5.65 g/L at pH 7. The guidelines state that a fish accumulation study is needed if the octanol/water partition coefficient is greater than 1000 and the water solubility is less than 0.5 mg/L. Because the above values for XRD-498 do not even approach those which trigger the accumulation study, we request that reconsideration be given to the need for this requirement."

EFGWB's Response

EFGWB concurs with the waiver request of the fish accumulation study at this time. XRD-498 would not be expected to accumulate in fish due to its extremely low octanol/water coefficient (1.62).

ITEM 2:

The aerobic soil metabolism studies only partially fulfills the Agency's Subdivision N data requirement. To fulfill the aerobic soil data requirement, a study of the aerobic soil metabolism of phenyl-labelled [^{14}C]XRD-498 is required.

DowElanco's Response:

The phenyl-labelled (^{14}C)XRD-498 study is nearing completion and will be submitted in support of the full registration application.

EFGWB's Response:

The aerobic soil metabolism study submitted for the EUP is acceptable to support the EUP. However, the phenyl-labelled aerobic soil metabolism study is required for full registration.

11: <u>COMPLETION OF ONE-LINER:</u>

See attached one-liner.

12: **CBI APPENDIX:**

The information is considered to be CBI by the registrant, and should be treated as such.

ENVIRONMENTAL FATE & GROUND WATER BRANCH
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY

Common Name: **XRD-498** Date: 01/23/90
Chem. Name : N-(2,6-difluorophenyl)-5-methyl-1,2,4-triazolo[1,5a]
: pyrimidine-2-sulfonamide
Shaugh. # : CAS Number: 98967-40-9
Type Pest. : Herbicide
Formulation: 75G
Uses : used to control broadleaf weeds on soybeans and field corn
:
:

Empir. Form: $C_{12}H_9F_2N_5O_2S$ VP (Torr): 10-15
Mol. Weight: 325.3 Log Kow : 0.209
Solub.(ppm): 5650 at pH 7 @ 25 °C Henry's :

Hydrolysis (161-1)
pH 5:[#] Stable
pH 7:[#] Stable
pH 9:[#] Stable
pH :[ ]
pH :[ ]
pH :[ ]

Photolysis (161-2, -3, -4)
Air :[ ]
Soil :[ ]
Water:[ ]
:[ ]
:[ ]
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MOBILITY STUDIES (163-1)

Soil Partition (Kd)
1.[ ]
2.[ ]
3.[ ]
4.[ ]
5.[ ]
6.[ ]

Rf Factors
1.[ ]
2.[ ]
3.[ ]
4.[ ]
5.[ ]
6.[ ]

METABOLISM STUDIES (162-1,2,3,4)

Aerobic Soil (162-1)
1.[ ]
2.[ ]
3.[ ]
4.[ ]
5.[ ]
6.[ ]
7.[ ]

Anaerobic Soil (162-2)
1.[ ]
2.[ ]
3.[ ]
4.[ ]
5.[ ]
6.[ ]
7.[ ]

Aerobic Aquatic (162-4)
1.[ ]
2.[ ]
3.[ ]
4.[ ]

Anaerobic Aquatic (162-3)
1.[ ]
2.[ ]
3.[ ]
4.[ ]

[*] - Acceptable Study. [#] = Supplemental Study

Common Name: **XRD-498** Date: 01/23/90

VOLATILITY STUDIES (163-2,3)

[ ] Laboratory:
[ ] Field:

DISSIPATION STUDIES (164-1,2,3,5)

Terrestrial Field (164-1)
1.[ ]
2.[ ]
3.[ ]
4.[ ]
5.[ ]
6.[ ]

Aquatic (164-2)
1.[ ]
2.[ ]
3.[ ]
4.[ ]
5.[ ]
6.[ ]

Forestry (164-3)
1.[ ]
2.[ ]

Other (164-5)
1.[ ]
2.[ ]

ACCUMULATION STUDIES (165-1,2,3,4,5)

Confined Rotational Crops (165-1)
1.[ ]
2.[ ]

Field Rotational Crops (165-2)
1.[ ]
2.[ ]

Irrigated Crops (165-3)
1.[ ]
2.[ ]

Fish (165-4)
1.[ ]
2.[ ]

Non-Target Organisms (165-5)
1.[ ]
2.[ ]

Common Name: **XRD-498** Date: 01/23/90

GROUND WATER STUDIES (158.75)

1.[ ]
2.[ ]
3.[ ]

DEGRADATION PRODUCTS

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

COMMENTS

To be updated 1 Feb. 1990

References: EPA reviews of studies
Writer : g. maske