Shaughnessy No.: 101101

Date Out of EAB: NOV 05 1985

To: R. Taylor
Product Manager #25
Registration Division (TS-767)

From: Emil Regelman, Chief (acting)
Review Section #3
Exposure Assessment Branch
Hazard Evaluation Division (TS-769)

Attached, please find the EAB review of...

Reg./File # : 3125-270

Chemical Name: Metribuzin

Type Product : Herbicide

Product Name : Sencor

Company Name : Mobay Chemical Corporation

Purpose : Response to Registration Standard

Action Code(s): 660

EAB #(s) : 5927

Date Received: 9/17/85

TAIS Code: 44

Date Completed: NOV 5 1985

Total Reviewing Time: 3.5 days

Deferrals to:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

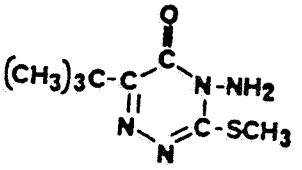
/

1. CHEMICAL: Common name: Metribuzin

Chemical name: 4-Amino-6-(1,1-dimethylethyl)-3-(methylthio)-1,2,4-triazin-5(4H)-one.

Trade name(s): BAY DIC 1468, BAY 94337, LEXONE, SENCOR, SENCORAL, SENCOREX

Structure:



Formulations: 50, 70, and 75% WP, 4 lb/gal FlC.

Physical/Chemical properties:
Molecular formula: $C_8H_{14}N_4OS$
Molecular weight: 214.3
Physical state, color, odor: white crystalline solid, mild chemical odor.
Specific gravity: 1.28
Melting point: 125.5 to 126.5 C
Relative resistance to decomposition by UV: relatively stable.
Vapor pressure: $<1 \times 10^{-5}$ mmHg at 20 C, 2×10^{-4} mmHg at 60 C.
Solubility: Ethanol, 13 g/100 g at 20 C
Kerosene or diesel oil, <1 g/100 g at 20 C
Methanol, 45 g/100 g at 20 C
Methylene chloride, 33.3 g/100 g at 20 C
Water, 122 mg/100 g at 20 C
Flamability: Nonflammable
Corrosiveness: Noncorrosive
Storage stability: Estimated shelf life is in excess of 2 years under normal storage conditions.

2. TEST MATERIAL: [^{14}C]Metribuzin, radiopurity >95%, specific activity 26.8 mCi/mM.

3. STUDY/ACTION TYPE: Addendum to Metribuzin Standard in order to fill data gaps.

4. STUDY IDENTIFICATION: Lenz, F.M. 1979. Soil adsorption and desorption of Sencor. Unpublished study received Aug. 26, 1985 under 3125-270, -305, -277, -294, -314, and -325; submitted by Mobay Chemical Corp., Kansas City, MO. In Supplement No. 5 to Brochure entitled: Sencor, the Effects on the Environment -- Environmental Chemistry. Volume II. Accession No. 259163. Reference No. 67581.

5. REVIEWED BY:

Paul Mastradone
Chemist
EAB/HED/OPP

Signature: Paul J Mastradone
Date: NOV - 4 1985

6. APPROVED BY:

Emil Regelman
Chief (acting)
Review Section #3, EAB/HED/OPP

Signature: Elee Dean
Date: NOV 5 1985

7. CONCLUSIONS:

Of the 188 studies in these submissions 187 fell into five categories. These studies were not reviewed for the reasons noted below:

1. Studies not relevant to environmental fate: 12 Studies.

2. Analytical methods: 48 Studies. These were not reviewed as there were no relevent data included in these studies. Copies of the methods will be retained in the branch files for future reference.

3. Rotational Crop Studies: 103 Studies. All studies exhibited similar difficiencies and were considered invalid. The submitted data were randomly organized with no distinct statements of purpose, materials and methods or summarization and conclusions making complete review of the data impossible. Additionally, no soils data were provided with the studies making determination of the extent of crop uptake of metribuzin impossible.

4. Combination product and tank mix studies: 20 Studies. Data requirements for this section of the guidelines are being reserved at this time. Consequently, these data were not reviewed.

5. Previously submitted and reviewed studies: 4 Studies. No additional data were supplied. Previous conclusions stand in each case.

The remaining study on the adsorption and desorption of metribuzin in soils ~~that~~ was found to be scientifically valid but did not fulfill guidelines. The study lacked information on the CEC of the soils used. The desorption solution was not a calcium solution as prescribed in the guidelines. The study indicated that in aqueous solution metribuzin was weakly adsorbed to sandy loam, silt loam and silty clay soils with Freundlich K_d's of 1.32, 1.90 and 1.53 respectively. A water solution desorbed 2.1% to 28% of the sorbed metribuzin with K_d's of 318, 180 and 308 for the respective soil types.

8. RECOMMENDATIONS:

Rotational crop studies: The registrant should submit studies in a coherent format which will allow for a more complete and accurate review. The submitted materials should be organized into concise parts which should include distinct statements of purpose, materials and methods, results, discussion and conclusions sections. Additionally, the registrant should provide the necessary soil data for each of these studies.

Soil adsorption/desorption study: This study did not fulfill guidelines because the CEC of the soil was not provided and the solution used was not a calcium solution as prescribed by the guidelines. A new study, done as prescribed in the guidelines, will be needed to fulfill guideline requirements.

9. BACKGROUND:

A. Introduction

This report is a scientific evaluation of environmental fate data on metribuzin submitted by Mobay Chemical Corp. under Accession Nos. 259161, 259162, and 259163. A total of 188 studies were contained in these three Accessions; of these, only 1 study (Mobay Report No. 67581) has been given a complete review. Mobay Report Numbers for the remaining studies are listed below:

Analytical methods (48 studies)

40468	50449	52909	65819	68099
43662	50828	52982	66610	68279
40901	50834	53541	66766	68280
33005	50974	53542	66767	68281
33058	51124	53743	66768	84327
33289	51299	54209	66769	84328
35845	52661	54211	67088	84329
42471	52662	54302	67089	50448
44621	52664	54303	67591	
47371	52669	65428	67690	

Not relevant to environmental fate (12 studies)

38927	42449	44857	66233
42373	42450	54355	67589
42448	44696	66147	68332

Combination product and tank mix studies (20 studies)

65851	66708	67090	67670	68197
65852	66709	67091	67671	68198
65853	67086	67092	67672	68199
65854	67087	67093	67673	68200

4

Studies previously reviewed (4 studies)

49127 - reviewed as Study 10 in Metribuzin Standard.
51016 - reviewed as Study 15 in Metribuzin Standard.
51903 - reviewed as Study 14 in Metribuzin Standard.
66120 - reviewed as Study 9 in Metribuzin Standard.

Rotational crop studies (103 studies; all studies are invalid because no soil data were provided, therefore, the extent of uptake of metribuzin by the rotational crops could not be determined)

66121	49571	65444	65464	66345
66122	51116	65445	65465	66346
47920	51117	65446	65466	66347
48187	53945	65447	65467	66348
48190	53947	65448	65577	66349
48191	54123	65449	66330	66350
48192	54145	65450	66331	66351
48195	54146	65451	66332	66352
48196	54336	65452	66333	66353
49075	54349	65453	66334	66400
43871	65433	65454	66335	67848
43879	65434	65455	66336	68042
48665	65435	65456	66337	68358
48670	65436	65457	66338	84830
48676	65437	65458	66339	84331
48677	65438	65459	66340	84332
48694	65439	65460	66341	84333
49360	65440	65461	66342	84334
49361	65441	65462	66343	84335
49458	65442	65463	66344	84336
49131	65443			
49133				

B. Directions for Use

Metribuzin is a selective, triazine herbicide registered for use on a variety of field crop, vegetable crop, turf (bermudagrass), and terrestrial noncrop (including railroad rights-of-way) sites. Of the total amount of metribuzin applied in the United States, based on a 1984 estimate, 94% was used on soybeans, with 1.8, 1.5, and 1.2% used on potatoes, wheat, and sugarcane, respectively. Application rates range from 0.13-2.0 lb ai/A on most field and vegetable crops, 2-6 lb ai/A on sugarcane, and 1.0-7.5 lb ai/A on noncrop sites. Metribuzin is only formulated as single active ingredient products. Single active ingredient formulations consist of 50, 70, and 75% WP, and 4 lb/gal FlC. Metribuzin may be applied broadcast or in a band using ground equipment and may also be applied aerially or by sprinkler irrigation systems (potatoes). Metribuzin may be soil incorporated, surface applied, or applied foliarly. Applicators need

not be certified or under the direct supervision of applicators certified to apply metribuzin.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

See attached review.

11. COMPLETION OF ONE-LINER:

12. CBI APPENDIX:

No CBI is included.

CASE GS0091 METRIBUZIN STUDY 1 PM 25 06/21/83

CHEM 101101 Metribuzin

BRANCH EFB DISC --

FORMULATION 00 - ACTIVE INGREDIENT

FICHE/MASTER ID No MRID CONTENT CAT 01

Lenz, F.M. 1979. Soil adsorption and desorption of Sencor. Unpublished study received Aug. 26, 1985, under 3125-270,-305,-277,-294,-314, and -325; submitted by Mobay Chemical Corporation, Kansas City, MO. In Supplement No. 5 to Brochure entitled: Sencor, The Effects on the Environment -- Environmental Chemistry. Volume II. Accession No. 259163. Reference No. 67581.

SUBST. CLASS = S.

DIRECT RVW TIME = 2 (MH) START-DATE END DATE

REVIEWED BY: K. Patten
TITLE: Staff Scientist
ORG: Dynamac Corp., Enviro Control Division, Rockville, MD
TEL: 468-2500

SIGNATURE: DATE: Oct. 24, 1985

APPROVED BY:
TITLE:
ORG:
TEL:

SIGNATURE: DATE:

CONCLUSIONS:

Mobility - Leaching and Adsorption/Desorption

1. This study is scientifically valid.

2. [^{14}C]Metribuzin (radiopurity >95%), at 1.1-102 ppm, was weakly adsorbed to sandy loam, silt loam, and silty clay soils; in a 1:5 soil:water slurry, Freundlich K_{ads} values were 1.32, 1.90, and 1.53 for the sandy loam, silt loam, and silty clay soils, respectively. Between 2.1 and 28.9% of the adsorbed metribuzin was desorbed; Freundlich K_{ads} values (4 washes) were 318 for the sandy loam, 186 for the silt loam, and 308 for the silty clay.

3. This study does not fulfill EPA Data Requirements for Registering Pesticides because a calcium ion solution was not used and the CEC of the soil was not reported.

MATERIALS AND METHODS:

[^{14}C]Metribuzin (Sencor, radiopurity >95%, specific activity 26.8 mCi/mM, Mobay Chemical Corporation) was added at 1.1, 4.6, 8.6, and 102 ppm to soil:water (1:5) slurries (Table 1). The samples were agitated in a reciprocating shaker waterbath maintained at 30 C for 24 hours. The samples were then centrifuged and the supernatant analyzed for total radioactivity by LSC.

The soil sediment from each adsorption sample was mixed with distilled water (1:5 soil:water ratio) for 24 hours in the shaker waterbath; the samples were centrifuged and the supernatant analyzed for total radioactivity by LSC. This desorption procedure was repeated three additional times.

REPORTED RESULTS:

Freundlich K_{ads} values were 1.32 for the sandy loam soil, 1.90 for the silt loam soil, and 1.53 for the silty clay soil. A total of 2.1-28.9% of the adsorbed metribuzin desorbed during four washes; K_{des} values were 317.5 for the sandy loam soil, 185.9 for the silt loam soil, and 307.7 for the silty clay soil (Table 2).

DISCUSSION:

1. The study was conducted in water rather than a calcium ion solution.

2. The CEC of the soils was not reported.

Table 1. Soil characteristics.

Soil type	Sand	Silt	Clay	Organic matter	pH	Kd
	%					
Sandy loam	74	14	13	2.8	6.6	1.32
Silt loam	18	57	25	5.0	7.9	1.90
Silty clay	0	41	59	0.5	6.0	1.53

Adsorption and desorption of [^{14}C]metribuzin (radiopurity >95%) on various soils.

	Initial [^{14}C]metribuzin concentration (ppm)	Adsorption %	Desorption[a]
oam	1.09	24	3.0
	4.61	18	8.7
	8.60	16	28.9
	102.0	17	2.1
ıam	1.09	29	15.6
	4.61	26	25.5
	8.60	21	21.3
	102.0	28	4.5
:lay	1.09	26	9.0
	4.61	20	13.6
	8.60	19	9.2
	102.0	17	2.9

l adsorbed that was desorbed after four washes.