

4/16/87
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Date Out of EAB: _____ 0 1987

APR 10 1987

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

From: Therese Dougherty, Acting Chief
Environmental Fate Review Section #1
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

TRD

Attached, please find the EAB review of...

Reg./File # : 352-UUA

Chemical Name: DPX-M6316

Type Product : Herbicide

Product Name : Harmony 75DF

Company Name : E.I. du Pont de Nemours and Co., Inc.

Purpose : Application for full registration to control various
broadleaf weeds in wheat and barley

Date Received: 7/22/86

Action Code: 110

Date Completed: APR 10 1987

EAB #(s) : 6744

Monitoring study requested: X

Total Reviewing Time: _____

Monitoring study voluntarily: _____

Deferrals to: _____ Ecological Effects Branch
_____ Residue Chemistry Branch
X Toxicology Branch

1. CHEMICAL: Common name:

DPX-M6316

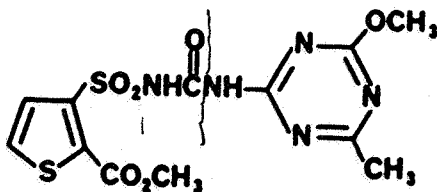
Chemical name:

Methyl 3-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)-amino]carbonyl]amino]sulfonyl]-2-thiophencarboxylate

Trade name(s):

Harmony 75DF

Structure:



Formulations:

75% G

Physical/Chemical properties:

Molecular formula: C₁₂H₁₃N₅O₆S₂

Molecular weight: 387.4

Physical state: White, crystalline solid.

Melting point: 186°C.

Density: 1.49 g/cc.

Vapor pressure: 2.7 x 10⁻⁶ mm Hg at 25°C.

Solubility: In water at pH 4.0 (0.024 mg/mL), pH 5.0 (0.26 mg/mL), pH 6.0 (2.4 mg/mL). In acetone (11.9 mg/mL), acetonitrile (7.3 mg/mL), ethanol (0.9 mg/mL), ethyl acetate (2.6 mg/mL), hexane (<0.1 mg/mL), methanol (2.6 mg/mL), methylene chloride (27.5 mg/mL), xylenes (0.2 mg/mL).

2. TEST MATERIAL:

See individual studies.

3. STUDY/ACTION TYPE:

Application for full registration for use as an herbicide to control various broadleaf weeds in wheat and barley.

4. STUDY IDENTIFICATION:

Ferguson, E.M. 1986a. Photodegradation of [thiophene-2-¹⁴C]DPX-M6316 and [triazine-2-¹⁴C]DPX-M6316 on soil. Document No. AMR-505-86. E.I. du Pont de Nemours and Company, Inc., Wilmington, DE. Acc. No. 263760. Reference 3.

Ferguson, E.M. 1986b. Soil column leaching behavior of [thiophene-2-¹⁴C]DPX-M6316 and [triazine-2-¹⁴C]DPX-M6316. Document No. AMR 454-85. E.I. du Pont de Nemours and Company, Inc., Wilmington, DE. Acc. No. 263760. Reference 6.

Lewis, W. and L.G. Carter. 1986. Anaerobic aquatic metabolism of [thiophene-2-¹⁴C]DPX-M6316. Document No. AMR-540-86. E.I. du Pont de Nemours and Company, Inc., Wilmington, DE. Acc. No. 263760. Reference 5.

Priester, T.M. 1986. Batch equilibrium (adsorption/desorption) and soil thin-layer chromatography studies with [thiophene-2-¹⁴C]DPX-M6316. Document No. AMR-286-84. E.I. du Pont de Nemours and Company, Inc., Wilmington, DE. Acc. No. 263760. Reference 7.

Rapisarda, C. Undated. Aerobic soil metabolism of DPX-M6316 [thiophene-2-¹⁴C]. Document No. AMR-236-84. E.I. du Pont de Nemours and Company, Inc., Wilmington, DE. Acc. No. 263760. Reference 4.

Rapisarda, C. and M.T. Scott. 1985. Field dissipation studies with [thiophene-2-¹⁴C]DPX-M6316 in U.S. and Canadian soils. Document No. AMR-460-85. E.I. du Pont de Nemours and Company, Inc., Wilmington, DE. Acc. No. 263760. Reference 8.

Rhodes, B.C., M.K. Koeppe, and R.W. Reiser. 1986. Hydrolysis of ¹⁴C-DPX-M6316. Document No. AMR-224-84. E.I. du Pont de Nemours and Company, Inc., Wilmington, DE. Acc. No. 263760. Reference 1.

Ryan, D.L. 1986. Photodegradation of [thiophene-2-¹⁴C]DPX-M6316 and [triazine-2-¹⁴C]DPX-M6313 in water. Document No. AMR-511-86. E.I. du Pont de Nemours and Company, Inc., Wilmington, DE. Acc. No. 263760. Reference 2.

5. REVIEWED BY:

Therese Dougherty
Chemist
EAB/HED/OPP

Signature: Therese Dougherty

Date: 4/10/87

6. APPROVED BY:

Therese Dougherty
Acting Chief
Review Section #1, EAB/HED/OPP

Signature: Therese M. Dougherty

Date: APR 10 1987

7. CONCLUSIONS:

Adequate crop rotation data for the triazine moiety were not submitted.

See Discussion (Section 10) regarding the potential for leaching of degradates to ground water.

We defer to Toxicology Branch for a decision regarding toxicological concern for DPX-M6316 acid and/or the triazine amine (4-methoxy-6-methyl-1,3,5-triazin-2-amine) in ground water. In rat metabolism studies, very little degradation of parent compound occurred (T. B. Review dated 3/17/87). Therefore, although Marcia van Gemert, T. B., indicated low toxicological concern for parent compound, we need to know whether potential toxicity of the two degradates noted above warrants field monitoring to determine the amount and extent of leaching in sandy soils.

8. RECOMMENDATIONS:

EAB recommends against registration of DPX-M6316 until the required crop rotation data for residues of the triazine moiety in a leaf vegetable crop, a small grain crop, and a root crop are received and evaluated. Also, see the Recommendations at the end of this review. As noted under Conclusion, EAB defers to Toxicology Branch to address the potential toxicological concern for residues of DPX-M6316 acid and the triazine amine in ground water. Unless Toxicology Branch indicates lack of potential toxicological concern for residues of the two degradates, field monitoring will be required.

9. BACKGROUND:

A. Introduction

INFORMATION ON PREVIOUSLY REVIEWED STUDIES

Koeppel, M.K. and B.C. Rhodes. Undated. Hydrolysis of DPX-M6316 [thiophene-2-¹⁴C]. Document No. AMR-224-84. E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 072846.

This study was reviewed by EAB on 11/1/84 and does not fulfill data requirements because degradation products which comprised up to 35% of the applied radioactivity were not identified, and the fate of the triazine moiety of the test substance was not traced.

Friedman, P.L. Undated. Hydrolysis of ¹⁴C-4-methoxy-6-methyl-1,3,5-triazine-2-amine. Document No. AMR-136-83. E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 072846.

This study was previously reviewed (section 3.1 of EAB review dated 7/12/84 under DPX-T6376, Ally, Shaughnessy No. 122010) and was considered to be adequate to describe the fate of the triazine moiety.

Rapisarda, C. Undated. Microbial degradation of ^{14}C -DPX-4189 in soil. Document No. AMR-43-81. E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 072846.

This study was previously reviewed in connection with DPX-T6376 (Ally, EAB review dated 7/12/84) registration. It was concluded that this study adequately addressed the fate of the triazine moiety of the compound in soil. Since the triazine moiety in DPX-M6316 is the same as in DPX-4189 and DPX-T6376, the fate of the triazine moiety of DPX-M6316 in soil will be the same as that of DPX-4189.

Han, J. C-Y. Undated. Crop rotation study with ^{14}C -DPX-W4189. Document No. AMR-46-81. E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 072846.

This study was reviewed by EAB on 11/1/84 and does not fulfill data requirements because residues in the soil were not analyzed at the time of treatment, leafy vegetable, root and small grain crops were not studied, and no meteorological data were provided.

Harvey, J., Jr. Undated. Crop rotation study with ^{14}C -DPX-T6376 in the greenhouse. Document No. AMR-120-83. E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 072846.

This study was reviewed by EAB on 11/1/84 and does not fulfill data requirements because residues in the soil were not analyzed at the time of treatment, the material balance was not reported for the soil analyses, recoveries were not reported, concentrations of individual metabolites in the rotational crops were not reported, and no information concerning residue accumulation from the triazine moiety of the test substance was provided.

Anderson, J.J. Undated. Crop rotation study with ^{14}C -metsulfuron methyl in the field. Document No. AMR-190-84. E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 072846.

This study was reviewed by EAB on 11/1/84 and does not fulfill data requirements because residues in the soil were not analyzed at the time of treatment, concentrations of metabolites in the rotational crops were not reported, recoveries were not reported, rainfall and irrigation data were not provided, and no information concerning residue accumulation from the triazine moiety of the test substance was provided.

Larkin, J.C. 1984. DPX-M6316 [thiophene-2- ^{14}C] flow-through bioconcentration study with bluegill sunfish. Document No. AMR-182-84. Prepared by Biospherics Incorporated, MD, and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 072846.

This study was reviewed by EAB on 11/1/84 and fulfills data requirements by showing that DPX-M6316 appears not to bioaccumulate (BCF <0.8) in bluegill sunfish under flow-through conditions.

Hardesty, P.T. Undated. Crop rotation studies with DPX-M6316 [thiophene-¹⁴C] in the greenhouse. Document No. AMR-256-84. E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 254641.

This study was reviewed by EAB on 11/³⁰28/84 and fulfills data requirements for the thiophene moiety by providing information on the accumulation of DPX-M6316 thiophene residues by rotational beets, peas, and sunflowers. Thiophene-labeled [¹⁴C]DPX-M6316 residues appeared not to accumulate in the edible parts of rotational crops planted 30 and 120 days after treatment at 86 g/ha. Residues accumulated primarily in the foliage, but intact DPX-M6316 accounted for <4% of the total radioactivity in the foliage.

B. Directions for Use

According to the submitted label, DPX-M6316 is an herbicide recommended for selective postemergent control of various broadleaf weeds in wheat and barley. The proposed application rate is 0.33-0.67 oz ai/A. DPX-M6316 is formulated as a single active ingredient product (75% G) and applied as a spray by air or ground equipment.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

DPX-M6316 acid readily leached in the aged column leaching study and some evidence for leaching was evident in the field study, which was not conducted on sandy soils, where leaching to a greater extent would be expected.

Silt loam soil field data indicated persistence and leaching of the triazine amine. The latter degradate is stable to hydrolysis at PH 5, 7 and 9 for 30 days; therefore, if residues leach to ground water, they could persist.

We note that, in the field studies, parent compound was applied at about 4-5 times the proposed maximum application rate for DPX-M6316. Although leached residues in the silt loam field soils were in the low ppb range, we do not know the extent of leaching in sandy soils under actual use conditions. Also, water residues could be seven to eight times the levels found in soil.

See attached reviews of individual studies.

11. COMPLETION OF ONE-LINER:

Not completed.

12. CBI APPENDIX:

All data reviewed here are considered CBI by the registrant and must be treated as such.