

2/17/87 2-11-87

Shaughnessy #: 128201

Date out of EAB: _____

Signature : FEB 11 1987

To: Taylor/Walters
Product Manager #25
Registration Division TS- 767

From: Emil Regelman
Supervisory Chemist
Section # 3
Exposure Assessment Branch
Hazard Evaluation Division TS 769c



Attached please find the EAB review of:

Reg./File No. 352-UUR

Chemical: DPX-Y6202 (Quizalofop ethyl)

Type Product: Herbicide

Product Name: Assure, Targa

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

Submission Purpose: Addendum to an Application for full Registration

Date In: 8/14/86

Action Code: 111

Date Completed: 2/10/87

EAB # ~~5874~~ 50874

Monitoring Requested: _____

TAIS (Level II) Days

Monitoring Voluntary: _____

65 3.0

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch



E. I. DU PONT DE NEMOURS & COMPANY

INCORPORATED

WILMINGTON, DELAWARE 19898

AGRICULTURAL CHEMICALS DEPARTMENT

August 6, 1985

Mr. Robert J. Taylor
Product Manager (25)
Insecticide Rodenticide Branch
Registration Division (TS-757C)
U.S. Environmental Protection Agency
1921 Jefferson Davis Highway
Arlington, VA 22202

Subject: Du Pont Assure[®] Herbicide
Pesticide Petition No. 5F3252
EPA File Symbol 352-UUR (441)
Submission of May 7, 1985
Submission of Supplemental Data and Revised Section B

Dear Mr. Taylor:

Attached as listed below are 3 copies each of data supplemental to the subject pesticide petition. In addition 3 copies of a revised Section B, labeling dated 050785, 080285, is submitted for your review. This version corrects several typographical errors, revises the crop rotation statement to correspond to that approved in our EUP labeling and adds the required storage and disposal statement. Five copies of revised labeling are included for your files.

Supplemental Data

Environmental Fate

- o Batch Equilibrium (Adsorption/Desorption) and Soil Thin-Layer Chromatography Studies with [Quinoxaline-¹⁴C] 2-[4-(6-chloro-quinoxalin-2-yloxy)phenoxy] propanoic acid. "DPX-Y6202" Acid. AMR-336-85, Revision 1 5/22/85
- o Photodegradation of [Quinoxaline-¹⁴C]DPX-Y6202 on Soil, AMR-289-84
- o Soil Column Leaching Behavior of [Quinoxaline-¹⁴C] DPX-Y65202, AMR-357-85
- o Field Soil Dissipation of [Phenyl-¹⁴C(U)] and [Quinoxaline-¹⁴C] DPX-Y6202 in Delaware, North Carolina, Illinois and Mississippi, AMR-333-85

Residue Chemistry

Please include the following two items in Exhibit 41 of the subject petition.

- o Aerial Drift Study - Plot design.
- o Protocol for Aerial Drift Study

Toxicology

Fish and Wildlife

- o Revised 43-Hour EC50 to Daphnia Magna, HLR-458-84

Human and Domestic Animal Safety

- o Metabolism of [Quinoxaline-¹⁴C] and [Phenyl-¹⁴C(U)] DPX-Y6202 in Rats, AMR-221-84

Sincerely,



Tony E. Catka
Registration & Regulatory Affairs

TEC/bms
1511g

Attachments

1. CHEMICAL: Common name:

DPX-Y6202 (quizalofop ethyl)

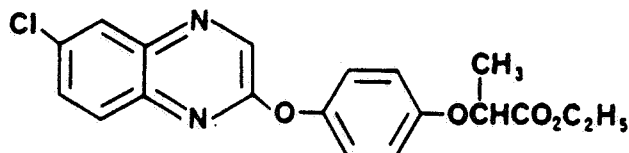
Chemical name:

Ethyl 2-[4-(chloroquinoxalin-2-yl)oxy]propanoate

Trade name(s):

Assure, Targa, Pilot, NC-302

Structure:



Formulations:

9.5% and 10% EC, 10% and 50% SC

Physical/Chemical properties:

Molecular formula: $C_{19}H_{17}ClN_2O_4$

Molecular weight: 372.5

Physical state: White crystalline solid

Melting point: 91.7-92.1°C

2. TEST MATERIAL:

See individual studies.

3. STUDY/ACTION TYPE:

Addendum to an application for full registration.

4. STUDY IDENTIFICATION:

The following studies are new submittals:

Cadwgan, G.E. and B. Atkins. 1985. Field soil dissipation [phenyl- ^{14}C -(U)] and [quinoxaline- ^{14}C]DPX-Y6202 in Delaware, North Carolina, Illinois and Mississippi. Report No. AMR-333-85. Unpublished study prepared and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

Monson, K.D. 1985. Soil column leaching behavior of [quinoxaline- ^{14}C]DPXY6202. Report No. AMR-357-85. Unpublished study prepared and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

Priester, T.M. 1985. Batch equilibrium (adsorption/desorption) and soil thin-layer chromatography studies with [quinoxaline-¹⁴C] 2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy]propanoic acid ("DPX-Y6202 acid"). Report No. AMR336-85. Unpublished study prepared and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

Ryan, D.L. 1985. Photodegradation of [quinoxaline-¹⁴C] DPX-Y6202 on soil. Report No. AMR-289-84. Unpublished study prepared and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

5. REVIEWED BY:

John H. Jordan, Ph.D
Microbiologist
EAB/HED/OPP

Signature: *John H. Jordan*

Date: 2/6/87

6. APPROVED BY:

Emil Regelman
Supervisory Chemist
Review Section #3, EAB/HED/OPP

Signature: *E Regelman*

Date: FEB 11 1987

7. CONCLUSIONS: Terrestrial Food/Non-Food Use Requirements - Full Registration

Requirements Satisfied

Hydrolysis
Photodegradation in Water
Aerobic Soil Metabolism
Leaching ads./desorption
Fish Accumulation

Conditional

Field Volatility
Long-Term Field Dissipation
Rotation Crops - Field
Re-entry

Data Gaps

Photodegradation on Soil
Anaerobic Soil Metabolism
Laboratory Volatility
Terrestrial Field Dissip.
Rotation Crop - Confined

8. RECOMMENDATIONS:

Data gaps and satisfied requirements are summarized in Section 7, above. Additional data are required for Terrestrial Food/Non-Food uses as indicated under data gaps. Also, conditional requirements depend upon the results of required studies not completed to date. Registration of additional uses will require more data than indicated in the above summary.

9. BACKGROUND:

A. Introduction

Purpose of this action: Submitted by du Pont to fill data gaps for full registration of Terrestrial Food/Non-Food uses.

INFORMATION ON PREVIOUSLY REVIEWED STUDIES

Cadwgan, G.E. 1983. Hydrolysis of [¹⁴C]quinoxaline-labeled DPX-Y6202. Document No. AMR-151-83. Prepared and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE.

This study was reviewed by EAB on 1/25/84 and fulfills data requirements for hydrolysis by showing that DPX-Y6202 degraded with half-lives of 2 days at pH 9, 30 days at pH 7, and >600 days at pH 5. The major hydrolytic product was the de-esterified acid of DPX-6202.

Cadwgan, G.E. and R.D. McFetridge. 1985. Aerobic soil metabolism of [phenyl-¹⁴C(U)]DPX-Y6202. Prepared and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Report No. AMR-329-85. Acc. No. 073548.

This study was reviewed by Dynamac Corporation on 9/18/85 and fulfills data requirements for aerobic soil metabolism. DPX-Y6202 was metabolized with a half-life of less than a day to 2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy]propanoic acid, which was further metabolized to 4-(6-chloroquinoxalin-2-yloxy)phenol, ethyl-2-[(4-hydroxyphenyl)oxy]propanate, 2-[(4-hydroxyphenyl)oxy]propanoic acid, and CO₂.

Cadwgan, G.E. and R.D. McFetridge. 1985. Anaerobic aquatic soil metabolism of [quinoxaline-¹⁴C]DPX-Y6202 and [phenyl-¹⁴C(U)]DPX-Y6202. Prepared and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Report No. AMR-350-85. Acc. No. 073548.

This study was reviewed by Dynamac Corporation on 9/18/85 and found to be scientifically valid. However, this study does not fulfill data requirements for anaerobic aquatic metabolism because all metabolites present at concentrations >0.01 ppm were not identified.

E.I. du Pont de Nemours and Co., Inc. 1983. Aerobic soil metabolism of [¹⁴C]phenyl-labeled DPX-Y6202. Document No. AMR-126-83.

This study was reviewed by EAB on 7/19/83 and was found to be scientifically valid. However, this study does not fulfill data requirements for either aerobic or anaerobic soil metabolism because of the lack of replication, purity of test substance was not specified, analytical methodology was not completely described, soils were not aged aerobically for 30 days prior to start of the anaerobic study, and uncertainty of anaerobicity in the anaerobic portion of the experiment.

Hutton, D.G. and D.J. Kasprcak. 1983. Residue studies with ¹⁴C-quinoxaline-labeled DPX-Y6202 in bluegill sunfish. Document No. AMR-155-83. Prepared by Haskell Laboratory of Toxicology and Industrial Medicine, Newark, DE and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE.

This study was reviewed by EAB on 1/25/84 and fulfills data requirements for accumulation in fish by showing that total bioconcentration of [¹⁴C]DPX-Y6202 in the edible portion of bluegill sunfish peaked at 16x and 10x on days 1 and 7 for exposure concentrations of 0.004 and 0.04 mg/L, respectively. The 28-day values were 1x and 4x, respectively. The 14-day depuration values were both 0.3x.

Koepppe, M.K. 1984. Crop rotation study with ¹⁴C-DPX-Y6202 in the greenhouse. Document No. AMR-218-84. Prepared and submitted by E.I. du Pont de Nemours and Co., Inc. Wilmington, DE.

This study was reviewed by EAB on 9/14/84 and found to be scientifically valid. However, this study does not fulfill data requirements for confined accumulation in rotational crops because the study was not conducted under conditions of maximal usage, resulting in a low level of total radioresidues making identification of specific components impossible; soil was not sampled at day 0.

Priester, T. 1985. Batch equilibrium (adsorption/desorption) and soil thin-layer chromatography studies with [quinoxaline-phenyl-¹⁴C(U)]DPX-Y6202. Prepared and submitted by Agricultural Chemicals Division, E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Report No. AMR-314-85. Acc. No. 073548.

This study was reviewed by Dynamac Corporation on 9/18/85 and fulfills data requirements for mobility of unaged DPX-Y6202 (batch equilibrium and soil TLC) by showing that DPX-Y6202 was strongly adsorbed (K_{ads} 4.8-14; R_f 0.05) onto four soils (two sandy loam soils and two silt loam soils) and was classified as Class 1 (immobile).

Ryan, D.L. 1985. Photolysis of DPX-Y6202 in water. Prepared and submitted by Agricultural Chemicals Division, E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Report No. AMR-275-84. Acc. No. 073548.

This study was reviewed by Dynamac Corporation on 9/18/85 and fulfills data requirements for photodegradation in water. Photolysis of DPX-Y6202 in aqueous buffer solution (pH 5) resulted in the formation of 2-[4-(6-chloroquinoxaline-2-yloxy)phenoxy]propanoic acid, 4-(6-chloroquinoxalin-2-yloxy)phenol, and 6-chloroquinoxalin-2-ol, with an estimated half-life of 55 days for DPX-Y6202.

Wakabayashi, T., H. Hirata, and S. Takano. 1985. Photolysis of NC-302 on soil. Prepared by Nissan Chemical Industries, Ltd., and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073548.

This study was reviewed by Dynamac Corporation on 9/18/85 and was found to be scientifically valid. However, this study does not fulfill data requirements for soil photolysis because the method used to quantify radioactive residues was not described, a poorly characterized Japanese soil was used in the study, and metabolites of concentration >0.01 ppm were not identified.

Wakabayashi, T., H. Hirata, and S. Takano. 1985. Mobility of NC-302 on soil. Prepared by Nissan Chemical Industries, Ltd., and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073548.

This study was reviewed by Dynamac Corporation on 9/18/85 and fulfills data requirements for mobility of unaged DPX-Y6202 (soil TLC) by showing that DPX-Y6202 was immobile ($R_f = 0.0$) in sand, sandy clay loam, silt loam, and clay loam soils.

Wakabayashi, T., H. Hirata, and S. Takano. 1985. Soil adsorption and desorption of NC-302 in soil. Prepared by Nissan Chemical Industries, Ltd., and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073548.

This study was reviewed by Dynamac Corporation on 9/18/85 and fulfills data requirements for mobility of unaged DPX-Y6202 (batch equilibrium) by showing that DPX-Y6202 was immobile (K_{ads} 15-99) in sand, sandy clay loam, silt loam, and clay loam soils.

B. Directions for Use

DPX-Y6202 is an herbicide to be used for the postemergent control of annual and perennial grass weeds in soybeans, cotton, peanuts, sugar beets, flax, rape seed, alfalfa, vegetables, and other broad-leaved crops. The 9.5% EC (Assure, 0.8 lb/gal) is to be applied at 0.075-0.25 lb ai/A depending on regional rainfall (proposed label dated August, 1985). In arid regions, a second application applied 2-3 weeks following the initial application is recommended; however, the total amount applied should equal the recommended rate.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

See attached reviews of individual studies.

11. COMPLETION OF ONE-LINER: One liner not completed to date.

12. CBI APPENDIX:

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

DPX-Y6202 (QUIZALOFOP ETHYL)

Final Report

**Task 1: Review and Evaluation of
Individual Studies**

**Task 2: Environmental Fate and
Exposure Assessment**

Contract No. 68-02-4250

JANUARY 29, 1987

Submitted to:
Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
The Dynamac Building
11140 Rockville Pike
Rockville, MD 20852

DPX-Y6202

Table of Contents

	<u>Page</u>
Introduction	
Scientific Studies	
1. Photodegradation on soil.	1
2. Mobility (batch equilibrium) of DPX-Y6202 acid.	6
3. Mobility (column leaching) of DPX-Y6202.	11
4. Terrestrial field dissipation.	17
Executive Summary	24
Recommendations	24
References	26
Appendix	28

INTRODUCTION

DPX-Y6202 is an herbicide to be used for the postemergent control of annual and perennial grass weeds in soybeans, cotton, peanuts, sugar beets, flax, rape seed, alfalfa, vegetables, and other broadleaved crops. The 9.5% EC (Assure, 0.8 lb/gal) is to be applied at 0.075-0.25 lb ai/A depending on regional rainfall (proposed label dated August, 1985). In arid regions, a second application applied ~2-3 weeks following the initial application is recommended; however, the total amount applied should equal the recommended rate.

11

CASE GS -- DPX-Y6202 STUDY 1 PM --

CHEM 128201 DPX-Y6202

BRANCH EAB DISC --

FORMULATION 00 - ACTIVE INGREDIENT

FICHE/MASTER ID No MRID CONTENT CAT 01
Ryan, D.L. 1985. Photodegradation of [quinoxaline-¹⁴C] DPX-Y6202 on soil.
Report No. AMR-289-84. Unpublished study prepared and submitted by
E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

SUBST. CLASS = S.

DIRECT RVW TIME = 8 (MH) START-DATE END DATE

REVIEWED BY: L. Binari
TITLE: Staff Scientist
ORG: Dynamac Corp., Rockville, MD
TEL: 468-2500

APPROVED BY: J. Jordan
TITLE: Microbiologist
ORG: EAB/HED/OPP
TEL: 557-5457

SIGNATURE: *[Signature]*

DATE: 2/6/87

CONCLUSIONS:Degradation - Photodegradation on Soil

The study does not satisfy EPA data requirements. Because of the <1 day half-life, the sampling procedure (time intervals) used during the experiment and the 16 hour thawing/air drying of samples, before analysis, were inappropriate. A study using some shorter sampling intervals must be initiated. Filter(s) that exclude wavelengths shorter than 290 nm and a temperature nearer 30°C must be used. The new study should include a sterile control.

MATERIALS AND METHODS:

Samples of sieved (2-mm) Woodstown sandy loam soil (67% sand, 25% silt, 8% clay, 1.4% organic matter, pH 4.5, CEC 4.0 meq/100 g) and Flanagan silt loam soil (4% sand, 70% silt, 26% clay, 3% organic matter, pH 5.8, CEC 24.4 meq/100 g) were placed in glass jars, moistened to 75% of field capacity, and surface-treated with quinoxaline-labeled [¹⁴C]DPX-Y6202 (radiochemical purity 99.4%, specific activity 58 Ci/mg, Daiichi Chemical Co.) at 0.1 ppm (1.4 oz ai/A). The jars were then covered with Saran Wrap. Irradiated samples were incubated at 37-38°C under artificial light (six black lamps, F20T 12BL and six sun lamps, FS20;

Westinghouse) with an intensity (at the sample surface) of 14.5 W/m^2 between 300 and 400 nm. The intensity of natural sunlight at midday in Wilmington, Delaware, was determined to be 40.4 W/m^2 at wavelengths between 300 and 400 nm. The spectral energy distribution of the artificial light source and natural sunlight at midday in Wilmington are presented in Figure 1. As controls, similarly prepared soil samples were covered with aluminum foil and incubated alongside the irradiated samples. Irradiated soil was sampled at 0, 3, 7, 14, 21, and 28 days post-treatment, and the dark controls were sampled at 14 and 28 days post-treatment. Soil samples were frozen until analysis.

Prior to analysis, the soil samples were thawed and allowed to air-dry for 16 hours at ambient temperatures. The samples were extracted four times with acetonitrile:water:85% phosphoric acid (90:10:1). The extracts were filtered, combined, and evaporated down to the aqueous fraction. The aqueous fraction was extracted three times with ethyl acetate, and then the extracted aqueous fraction, which contained <1% of the extracted radioactivity, was discarded. The ethyl acetate extracts were combined, concentrated, and analyzed by TLC on silica gel plates with development in toluene:tetrahydrofuran:formic acid (8:2:0.25) and toluene:acetone:methanol:acetic acid (150:60:12:1). Unlabeled standards were cochromatographed with the extracts. Following development, DPX-Y6202 and its degradates were visualized under UV light, with a TLC linear analyzer, and by autoradiography. Radioactive zones were quantified with the TLC linear analyzer, and by scraping the silica gel off the plates and counting using LSC.

Total radioactivity in the soil prior to extraction and unextractable radioactivity remaining in the soil were quantified by LSC following combustion.

Recoveries of parent DPX-Y6202 from soil fortified with [^{14}C]DPX-Y6202 and extracted immediately (5 minutes) after treatment ranged from 95.6 to 97% of the applied radioactivity

REPORTED RESULTS:

In the 0-day samples of Woodstown sandy loam and Flanagan silt loam soils prior to irradiation, DPX-Y6202 and DPX-Y6202 acid comprised 45-54 and 42-49% of the applied radioactivity, respectively (Tables 1 and 2). After 28 days of irradiation with artificial light, DPX-Y6202, DPX-Y6202 acid, phenol 1, and hydroxy-phenol 2 comprised 3-7, 62-65, 8-11, and 5-6% of the applied, respectively. After 28 days in the dark control, DPX-Y6202, DPX-Y6202 acid, hydroxy-phenol 2, and Unknown 3 comprised 3-9, 48-59, 17, and 6-12% of the applied radioactivity, respectively.

DISCUSSION:

1. Parent(a.i.) was apparently applied to moist soil in glass jars and subsamples were taken and frozen. Prior to analysis the samples were thawed and air-dried for 16 hours. Degradation occurred during drying. This procedure was inappropriate because of the rapid degradation rate of the test substance.
2. Wavelengths <290 nm were not filtered out.
3. Temperatures were 37 to 38° C.

ULTRAVIOLET SPECTRAL ENERGY DISTRIBUTION FROM:

- A. Laboratory irradiation apparatus 9.5 inches from light source.
- B. Natural mid-day summer sunlight, Wilmington, DE.

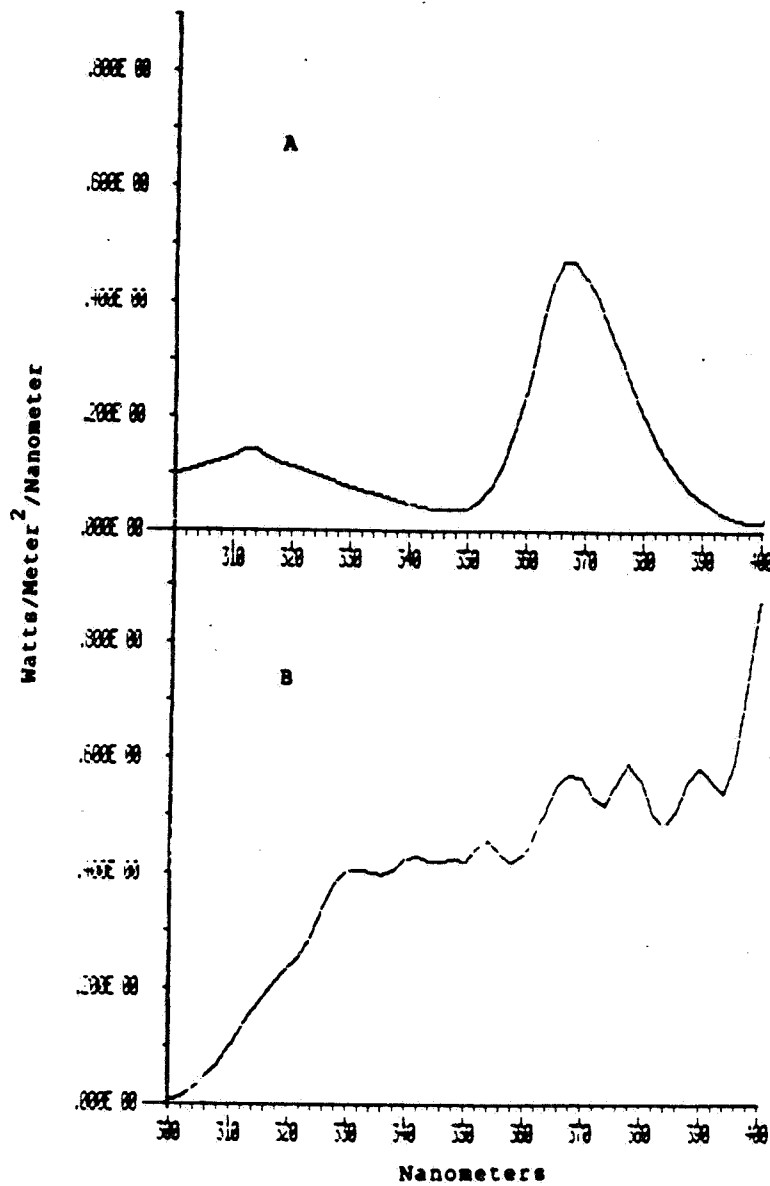


Figure 1. Spectral energy distribution of the artificial light source (A) and of natural sunlight at midday in Wilmington, Delaware (B).

Table 1. Distribution of radioactivity (% of applied) in Woodstown sandy loam soil treated with quinoxaline-labeled [^{14}C]DPX-Y6202 (purity 99.4%) at 0.1 ppm.

Sampling interval (days)	DPX-Y6202	DPX-Y6202 acid	Phenol 1	Hydroxy-Phenol 2	Phenol 2 and Unknowns with $R_f < 0.05$	Unknown 3	Polar degradates ^a	Unextractable [^{14}C]	Total
<u>Irradiated</u>									
0	54.2	41.5	0.8	1.4	1.4	0.2	0.9	0.2	100.6
3	7.9	74.7	3.2	3.0	2.8	0.4	1.6	2.4	96.0
7	5.1	74.6	6.7	4.8	4.3	1.0	2.4	3.6	102.6
14	5.6	67.0	8.4	3.7	5.6	1.0	2.5	3.8	97.6
21	3.2	61.0	12.1	4.9	5.2	1.3	4.4	6.2	98.3
28	6.5	62.2	11.3	4.6	4.2	0.8	3.3	6.2	99.1
<u>Dark Control</u>									
14	2.8	79.6	2.4	4.4	4.7	1.6	1.5	2.0	99.0
28	2.9	48.3	2.8	16.7	6.2	12.2	2.3	3.8	95.2

^aRadioactivity retained at preadsorbant zone of the TLC plate.

Table 2. Distribution of radioactivity (% of applied) in Flanagan silt loam soil treated with quinoxaline-labeled [¹⁴C]DPX-Y6202 (purity 99.4%) at 0.1 ppm.

Sampling interval (days)	DPX-Y6202	DPX-Y6202 acid	Phenol 1	Hydroxy-Phenol 2	Phenol 2 and Unknowns with R _F < 0.05	Unknown 3	Polar degradates ^a	Unextractable [¹⁴ C]	Total
<u>Irradiated</u>									
0	44.6	48.9	2.8	1.6	2.6	0.7	0.7	1.3	103.2
3	6.7	72.8	3.0	4.7	5.2	1.6	3.1	4.7	101.8
7	4.6	65.4	4.5	4.5	4.5	2.8	2.4	4.7	93.4
14	5.1	67.0	5.4	3.9	6.4	0.8	3.7	5.1	97.4
21	3.8	67.8	9.4	6.0	4.5	2.8	2.5	6.7	103.5
28	2.6	65.0	7.9	6.3	4.8	2.7	1.3	6.7	97.3
<u>Dark Control</u>									
14	3.8	61.9	1.7	9.7	4.1	4.2	4.9	5.1	95.4
28	4.2	58.7	2.9	16.6	5.3	6.2	5.7	8.3	107.9

^aRadioactivity remaining at preadsorbant zone of the TLC plate.

CASE GS -- DPX-Y6202 STUDY 2 PM --

CHEM 128201 DPX-Y6202

Branch EAB DISC --

FORMULATION 00 - ACTIVE INGREDIENT

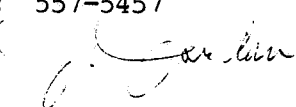
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Priester, T.M. 1985. Batch equilibrium (adsorption/desorption) and soil thin-layer chromatography studies with [quinoxaline-¹⁴C] 2-[4-(6-chloroquin-oxalin-2-yloxy)phenoxy]propanoic acid ("DPX-Y6202 acid"). Report No. AMR-336-85. Unpublished study prepared and submitted by E. I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

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REVIEWED BY: L. Binari
TITLE: Staff Scientist
ORG: Dynamac Corp., Rockville, MD
TEL: 468-2500

APPROVED BY: J. Jordan
TITLE: Microbiologist
ORG: EAB/HED/OPP
TEL: 557-5457

SIGNATURE: 

DATE: 2/6/87

CONCLUSIONS:Mobility - Leaching and Adsorption/Desorption

1. This study is scientifically valid.
2. Based on batch equilibrium studies, quinoxaline-labeled [¹⁴C]DPX-Y6202 acid, at 0.03-0.5 ppm, was very mobile in two sandy loam soils and mobile in two silt loam soils. Freundlich K_{ads} values were 1.5-1.9 and 16-20 for the sandy loam and silt loam soils, respectively; K_{oc} values were 0.36-0.66 and 1.1-1.2; and K_{des} values were 0.25 and 0.32-0.33. Based on soil TLC studies, [¹⁴C]DPX-Y6202 acid was mobile (R_f 0.17-0.35) in two sandy loam soils and had low mobility (R_f 0.07-0.12) in two silt loam soils.
3. This study partially satisfies EPA Data Requirements for Registering Pesticides by providing information on the mobility of the primary degradate, DPX-Y6202 acid, in four soils (two sandy loam and two silt loam soils). No additional studies are required, because previous studies satisfied unaged (parent) requirements.

MATERIALS AND METHODS:

Experiment 1

Four soils (two sandy loam and two silt loam soils) were oven-dried (conditions unspecified) prior to use (Table 1). Samples of each soil were shaken for 24 hours at 25°C with 0.01 N calcium sulfate solutions (containing <0.5% acetone) of quinoxaline-labeled [^{14}C] DPX-Y6202 acid (radiochemical purity >99%, specific activity 12.2 $\mu\text{Ci}/\text{mg}$, Daichi Chemical Co.) at 0.03-0.5 ppm. [^{14}C]Terbacil and carbonyl-labeled [^{14}C]diuron (radiochemical purities >95%) at 0.2-6.0 ppm were used as reference pesticides. The soil:solution ratio was 1:1. The solutions were centrifuged after shaking, and the supernatant was analyzed for total radioactivity by LSC.

Desorption of DPX-Y6202 acid residues was investigated in the soil samples described above that were treated at 0.25 and 0.5 ppm (6.0 ppm for the reference pesticides). The supernatant was replaced with untreated 0.01 N calcium sulfate solution, the soil:solution was shaken for 24 hours at 25°C, and the supernatant was analyzed for radioactivity by LSC. This procedure was repeated five additional times.

Experiment 2

The two sandy loam and two silt loam soils were hammer-milled to 1-5 μm and used to prepare soil TLC plates (400 μm thickness). The plates were spotted with quinoxaline-labeled [^{14}C]DPX-Y6202 acid (described above), and [^{14}C]terbacil and carbonyl-labeled [^{14}C]diuron were used as reference pesticides. The plates were developed in water to a distance of 10 cm. After development, the plates were air-dried for 24 hours and visualized by autoradiography.

REPORTED RESULTS:

Experiment 1

DPX-Y6202 acid was very mobile in the sandy loam soils and mobile in the silt loam soils. Freundlich K_{ads} values were 1.5-1.9 and 16-20; K_{oc} values were 0.36-0.66 and 1.1-1.2; and K_{des} values were 0.25 and 0.32-0.33 for the sandy loam and silt loam soils, respectively (Table 2).

Experiment 2

DPX-Y6202 acid was mobile (R_f 0.17-0.35) in the sandy loam soils and had low mobility (R_f 0.07-0.12) in the silt loam soils (Table 3).

DISCUSSION:

1. The DPX-Y6202 acid was used in the studies instead of the active ingredient DPX-Y6202.
2. The conditions under which the soils were dried were not reported.
3. The determined mobility classifications for the soils differed in the batch equilibrium and soil TLC studies possibly because the hammer-milling of the soil for TLC increased the fraction of fine particles (1-5 μm) comprising the soils.

Table 1. Soil characteristics.

Soil	Sand	Silt	%	Clay	Organic matter	pH	CEC (meq/100 g)
Woodstown sandy loam	60	33		7	1.1	6.6	5.3
Cecil sandy loam	61	21		18	2.1	6.5	6.6
Flanagan silt loam	2	81		17	4.3	5.4	21.1
Keyport silt loam	11	78		11	4.7	4.3	14.1

Table 2. Freundlich K and 1/n values for the adsorption and desorption of [^{14}C]DPX-Y6202 acid and two reference pesticides on four soils.

Soil type	Adsorption					Desorption			
	DPX-Y6202 acid			Terbacil	Diuron	DPX-Y6202		Terbacil	Diuron
	K _{ads}	K _{oc}	1/n _{ads}	K _{ads}	K _{ads}	K _{des}	1/n _{des}	K _{des}	K _{des}
Woodstown sandy loam	1.5	136	0.90	0.36	2.9	0.25	0.17	0.52	4.2
Cecil sandy loam	1.9	90	0.90	0.66	5.1	0.25	0.08	1.3	6.1
Flanagan silt loam	16	372	0.96	1.2	14	0.32	0.04	2.5	7.0
Keyport silt loam	20	425	0.88	1.1	13	0.33	0.00	2.4	7.0

20

Table 3. Soil thin-layer chromatography of [^{14}C]DPX-Y6202 acid and two reference pesticides.

Soil type	R _f Value		
	DPX-Y6202 acid	Terbacil	Diuron
Woodstown sandy loam	0.35	0.60	0.14
Cecil sandy loam	0.17	0.34	0.05
Flanagan silt loam	0.07	0.31	0.04
Keyport silt loam	0.12	0.29	0.05

21

CASE GS --

DPX-Y6202

STUDY 3

PM --

CHEM 128201

DPX-Y6202

BRANCH EAB

DISC --

FORMULATION 00 - ACTIVE INGREDIENT

FICHE/MASTER ID No MRID

CONTENT CAT 01

Monson, K.D. 1985. Soil column leaching behavior of [quinoxaline-¹⁴C] DPX-Y6202. Report No. AMR-357-85. Unpublished study prepared and submitted by E. I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

SUBST. CLASS = S.

DIRECT RVW TIME = 8

(MH) START-DATE

END DATE

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APPROVED BY: J. Jordan

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CONCLUSIONS:Mobility - Leaching and Adsorption/Desorption

1. This study is scientifically valid.
2. [¹⁴C]DPX-Y6202 residues were mobile (~10-23% of applied radioactivity in leachate) in 12-inch columns of sandy loam soil treated with unaged, quinoxaline-labeled [¹⁴C]DPX-Y6202 and leached with ~20 inches of water. [¹⁴C]Residues were less mobile (<1% of applied in leachate) in columns of silt loam soil. Parent DPX-Y6202 was detected primarily in the top 2 inches of the soil columns, while the primary degradate, DPX-Y6202 acid, was found throughout the soil columns and comprised ~95-97% of the recovered radioactivity in the sandy loam soil leachate extracts. Aged (30-day) DPX-Y6202 residues were mobile (~27% of applied in leachate) in Woodstown sandy loam soil. Parent DPX-Y6202 comprised <7% of the recovered radioactivity in the soil extracts, while the primary degradate, DPX-Y6202 acid, comprised ~62-75% and 95% of the recovered in the soil and leachate extracts, respectively.
3. This study does not fulfill EPA Data Requirements for Registering Pesticides because the length of time it took to leach the soil columns was

not reported; K_d values were not reported; degradate characterization results were presented as percent of recovered rather than percent of applied and extraction efficiencies were not reported; and, for the aged soil column, the test substance was aged for longer than one half-life and the aged residues were not characterized prior to leaching.

MATERIALS AND METHODS:

Four soils, two sandy loam and two silt loam soils (Table 1), were individually sieved (9-20 mesh) and packed to 12-13 inches in glass columns (2-inch diameter) already containing ~8 inches of water; excess water was drained off. Quinoxaline-labeled [^{14}C]DPX-Y6202 (radiochemical purity 99.3%, specific activity 19.3 $\mu\text{Ci}/\text{mg}$, New England Nuclear) in acetonitrile was applied to the top of the soil column at a rate of 8 oz ai/A (0.114 mg, 2.19 μCi). The column was capped with a layer of sand, leached with ~20 inches of water at a rate of <1 ml/minute, and the leachate was collected in fractions (fraction size unspecified). A 4-inch layer of water was maintained on top of the column during leaching.

Following leaching, radioactivity in the leachate fractions was quantified by LSC, and fractions containing radioactivity were combined. The composite leachate was adjusted to pH 4 with phosphoric acid and concentrated by evaporation. The concentrated leachate was adjusted to pH 2 and extracted four times with methylene chloride. The methylene chloride extracts were combined, concentrated, and analyzed by TLC on silica gel plates with development in toluene:acetone:methanol:acetic acid (150:60:12:1). Unlabeled standards were cochromatographed with the extracts. Following development, DPX-Y6202 and its degradates were visualized under UV light. Radioactive areas were detected and quantified with a TLC linear analyzer.

The soil column was disassembled into six 2-inch segments, and radioactivity was quantified by LSC following combustion. Soil segments which contained >5% of the applied radioactivity were extracted four times with acetonitrile:water:85% phosphoric acid (89:10:1). The soil was then extracted twice with 10% 0.1 M ammonium carbonate in acetone. The resulting acidic and basic extracts were filtered, concentrated, diluted with distilled water, reconcentrated, adjusted to pH 1.5 with 85% phosphoric acid, and extracted twice with ethyl acetate. The ethyl acetate extracts were filtered, evaporated to dryness, and the residues were dissolved in methylene chloride. The residues were analyzed for DPX-Y6202 and its degradates by TLC as described above.

In a study of aged residues, Woodstown sandy loam soil (Table 1) was moistened to 75% of field capacity, placed to a depth of 2 inches in a glass jar (2-inch diameter), and surface-treated with quinoxaline-labeled [^{14}C]DPX-Y6202 (0.114 mg, 2.19 μCi). The jar was covered with Saran Wrap, incubated at 22°C for 30 days, and was flushed weekly with oxygen. Following the 30-day aging period, the soil sample was placed on top of a 10-inch column of untreated Woodstown sandy loam soil and leached as described above. Leachate and soil samples were collected and analyzed as described above.

REPORTED RESULTS:

DPX-Y6202 residues were mobile in the sandy loam and silt loam soils with radioactivity distributed throughout the soil columns (Table 2). In the sandy loam soil columns, ~10-23% of the applied radioactivity was detected in the leachates, while <1% of the applied was found in leachates from the silt loam soil columns. Parent DPX-Y6202 was detected primarily in soil extracts from the top 2 inches of the columns, while the primary degradate, DPX-Y6202 acid, was found throughout the column and accounted for ~23-82% of the recovered radioactivity (Table 3). DPX-Y6202 acid comprised ~95-97% of the recovered radioactivity in the sandy loam soil leachate extracts.

Aged (30-day) DPX-Y6202 residues were mobile in Woodstown sandy loam soil (~27% of applied in leachate). The primary degradate, DPX-Y6202 acid, accounted for ~62-75% and ~95% of the recovered radioactivity in the soil and leachate extracts, respectively. Parent DPX-Y6202 comprised <7% of the recovered radioactivity in the soil extracts.

DISCUSSION:

1. The length of time it took to leach the soil columns with 20 inches of water was not specified.
2. Soil/water relationship (K_d) values were not reported; however, the study author stated that K_d values could not be calculated because <50% of the applied radioactivity was leached from the columns.
3. Degradate characterization results were presented as % of recovered rather than % of applied. The study author stated that recovery of radioactivity at each step of the soil extraction procedure was >90%, but the total extraction efficiency was not reported. Extraction efficiency from the leachates was also not reported.
4. For the aged soil column, DPX-Y6202 was aged for 30 days rather than its much shorter half-life (<2 weeks as based on an aerobic soil metabolism study; Cadwgan and McFetridge, Acc. No. 073548).
5. Aged residues were not characterized prior to leaching.

Table 1. Soil characteristics.

Soil type	Sand	Silt	%	Clay	Organic Matter	pH	CEC (meq/100 g)
Woodstown sandy loam	60	33		7	1.1	6.6	5.2
Cecil sandy loam	61	21		18	2.1	6.5	6.6
Flanagan silt loam	4	81		15	4.3	5.8	23.2
Keyport silt loam	22	69		9	5.6	4.5	16.4

Table 2. Distribution of [^{14}C]residues (% of applied radioactivity) in soil columns treated with [^{14}C]DPX-Y6202 and leached with ~20 inches of water.

Soil column section (inches)	Woodstown sandy loam	Cecil sandy loam	Flanagan silt loam	Keyport silt loam	Woodstown sandy loam ^a
0-2	78.1	30.8	45.4	61.9	45.6
2-4	1.6	6.2	23.1	19.6	6.1
4-6	1.5	7.8	15.9	10.0	5.8
6-8	1.7	7.0	7.0	3.7	5.8
8-10	1.4	8.9	2.0	0.9	4.5
10-12	2.1	9.4	0.3	0.1	3.7
Total in soil	86.4	70.1	93.7	96.2	71.5
Leachate	10.4	23.0	0.4	0.2	26.8
Total recovery	96.8	93.1	94.1	96.4	98.3

^a Treated with quinoxaline-labeled [^{14}C]DPX-Y6202 and aged for 30 days prior to leaching.

Table 3. DPX-Y6202 and its degradates (% of recovered radioactivity) in soil extracts and leachates from soil columns treated with [^{14}C]DPX-Y6202 and leached with ~20 inches of water.

Soil column	DPX-Y6202	DPX-Y6202 acid	Phenol 1	Phenol 2	Unknowns ^a
<u>Soil extracts</u>					
Woodstown sandy loam 0-2 inches	58.5	23.2	ND ^b	2.0	16.3
Cecil sandy loam 0-2 inches	29.1	49.2	ND	3.7	18.0
2-12 inches	7.9	81.2	ND	ND	10.9
Flanagan silt loam 0-2 inches	23.4	67.2	3.9	ND	5.2
2-8 inches	17.5	58.8	ND	3.9	19.8
Keyport silt loam 0-2 inches	51.2	41.6	3.6	ND	3.6
2-6 inches	ND	82.1	ND	ND	17.9
Woodstown sandy loam ^c 0-2 inches	7.0	75.3	2.4	4.4	10.9
2-8 inches	ND	62.2	ND	6.8	31.0
<u>Leachate extracts^d</u>					
Woodstown sandy loam 9.2-23.5 inches	ND	97.4	1.3	ND	1.4
Cecil sandy loam 6.6-20.7 inches	ND	95.2	1.3	ND	3.5
Woodstown sandy loam ^c 9.3-21.8 inches	ND	94.7	1.3	ND	4.1

^a Uncharacterized polar degradates.

^b Not detected, detection limit not specified.

^c Treated with quinoxaline-labeled [^{14}C]DPX-Y6202 and aged for 30 days prior to leaching.

^d Leachate fractions containing radioactivity were composited, extracted, and the extracts were analyzed.

CASE GS --

DPX-Y6202

STUDY 4

PM --

CHEM 128201

DPX-Y6202

BRANCH EAB

DISC --

FORMULATION 00 - ACTIVE INGREDIENT

FICHE/MASTER ID No MRID

CONTENT CAT 01

Cadogan, G.E. and B. Atkins. 1985. Field soil dissipation [phenyl-¹⁴C(U)] and [quinoxaline-¹⁴C]DPX-Y6202 in Delaware, North Carolina, Illinois and Mississippi. Report No. AMR-333-85. Unpublished study prepared and submitted by E. I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

SUBST. CLASS = S.

DIRECT RVW TIME = 12

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CONCLUSIONS:Field Dissipation - Terrestrial

This study does not satisfy data requirements because an inappropriate method was used. Field dissipation data are required under actual use conditions. Also, the test substance was not a typical end-use product, pretreatment soil samples were not collected and analyzed, field test data were incomplete and test material was not added to the soil at the highest label rate.

MATERIALS AND METHODS:

Stainless steel tubes (4 x 15 inches; inside diameter x length,) eight per site) were pushed 14.5 inches into untilled soil located in North Carolina, Mississippi, Delaware, and Illinois (Table 1). At each site the surface of the soil in the tubes was treated with quinoxaline-labeled [¹⁴C]DPX-Y6202 (radiochemical purity 99.9%, specific activity 58 uCi/mg, Daiichi Chemical Co.) at 2.6-3.9 oz ai/A between May 16 and June 9, 1983.

At an additional site in DE (eight steel tubes), the soil was treated with phenyl-labeled [^{14}C]DPX-Y6202 (radiochemical purity 99.4%, specific activity 65 $\mu\text{Ci}/\text{mg}$, Daiichi Chemical Co.) at 3.5 oz ai/A on July 21, 1983. Soil samples (the entire tube) were taken immediately after treatment and at 0.5, 1, 2, 4, 6, and 12 or 16 months posttreatment.

The cylinder of soil was frozen (-23°C), thawed for 1-2 days at room temperature, and dissected into segments (0-2, 2-4, 4-8 inches, and 8 inches-end). The soil segments were air-dried for ~1 day, milled, and frozen until analysis. Total radioactivity in the soil was quantified by combustion and LSC. Soil segments containing >5% of the applied radioactivity were extracted five times with acetonitrile:water:85% phosphoric acid (90:10:1) followed by two extractions with acetone:aqueous 0.1 M ammonium carbonate (9:1). Extracted soil samples which still contained >20% of the applied radioactivity (only MS soil samples) were further extracted with acetonitrile:water:85% phosphoric acid (90:10:5) with heating ($50-60^{\circ}\text{C}$) and ultrasonication. This was followed by extraction with acetone:aqueous 0.1 M ammonium carbonate (9:1) and aqueous 0.1 M ammonium carbonate with heating and ultrasonication.

All acidic and basic extracts were filtered, concentrated, diluted with water, and the organic solvents were removed by evaporation. The remaining aqueous phase was adjusted to pH 1.0 with 85% phosphoric acid and extracted twice with ethyl acetate. The ethyl acetate extracts were filtered, combined, and evaporated to dryness. The residue was dissolved in methylene chloride:acetone (1:1) and analyzed by TLC on silica gel with development in toluene:acetone:methanol:acetic acid (150:60:12:1). Unlabeled standards were cochromatographed with the extracts. Following development, DPX-Y6202 and its degradates were visualized under UV light and by autoradiography. Radioactive areas were scraped and quantified by LSC. Unextractable radioactivity remaining in the soil was quantified by combustion and LSC.

REPORTED RESULTS:

Total rainfall during the field tests was 56.4 inches at Fayetteville, North Carolina, 61.9 inches at Stoneville, Mississippi, 49.0 inches at Rochelle, Illinois, and 48.3 and 66.0 inches at Newark, Delaware (Table 2).

During the 12- and 16-month test periods, the majority of the applied radioactivity remained in the upper 4 inches of the soil columns (Table 2). At the first sampling interval (immediately posttreatment), parent DPX-Y6202 comprised only 9.1-47.9% of the applied radioactivity, while DPX-Y6202 acid comprised 36.9-66.3% of the applied (Tables 3 and 4). At 2 weeks posttreatment parent DPX-Y6202 comprised <9% of the applied. At 12 months after treatment of the loamy sand and silt loam soils with quinoxaline-labeled [^{14}C]DPX-Y6202, <2% of the applied DPX-Y6202 remained and degradates detected included DPX-Y6202 acid (1.1-14.4% of the applied radioactivity), phenol 1 (0.9-5.8%), phenol 2 (0.8-2.3%), and hydroxy-phenol 2 (4.6-23.1%). At 16 months after treatment of a silt loam soil with phenyl-labeled [^{14}C]DPX-Y6202, <3% of the applied DPX-Y6202 remained and degradates detected included DPX-Y6202 acid (8.0% of the applied radioactivity), phenol 1 (0.9%), phenol 3 (0.4%), and phenol 4

(2.2%). At 12 and 16 months posttreatment, unextractable [¹⁴C]residues comprised 12.5-21.1% of the applied radioactivity.

DISCUSSION:

1. The 2-3 days used to thaw, air-dry, and grind the soils prior to analysis allowed further degradation of the test substance to occur. This procedure was inappropriate considering the rapid degradation rate of the test substance. The registrant provided results indicating that the test substance did not degrade significantly during the extraction procedure; 90% of the applied parent DPX-Y6202 was recovered from silt loam soil that was extracted immediately after fortification with quinoxaline-labeled [¹⁴C]DPX-Y6202.
2. The dissipation of DPX-Y6202 from field soils enclosed by cylinders may not be representative of dissipation under actual use conditions. However, cylinders may be the only method for assessing very low volume pesticides, e.g., an ounce per acre (Glean) pesticide.

The duPont Co. was given permission by EAB to conduct cylinder studies instead of actual field dissipation studies for some pesticides, e.g., Glean (chlorsulfuron). Glean was tested in the field using cylinders, because only from one-sixth to two-thirds ounce is applied per acre. However, from 5 to 40 ounces of Assure (quizalofop) are applied per acre. Only those very low application rate pesticides may be tested using field cylinders.

3. The test substance was not a typical end-use product.
4. Pretreatment soil samples or controls from untreated areas were not collected and analyzed.
5. Soil and air temperature data and the depth of the water table were not reported.
6. The data from the Rochelle, Illinois, site are too variable to assess the dissipation of DPX-Y6202. Total [¹⁴C]residues recovered declined to 50% of the applied by 1 month posttreatment, then increased to 89% of the applied at 2 months posttreatment, and remained between 70-83% of the applied throughout the remainder of the test period.

Table 1. Soil characteristics.

Location	Soil type	Sand	Silt	%	Clay	Organic matter	pH	CEC (meq/100 g)
Fayetteville, North Carolina	Norfolk loamy sand	78	18		4	1.2	5.9	3.1
Stoneville, Mississippi	Dundee silt loam	8	74		18	1.4	6.4	5.3
Newark, Delaware	Keyport silt loam	21	62		17	2.8	6.4	8.2
Rochelle, Illinois	Flanagan silt loam	12	69		19	6.7	6.7	37.8

Table 2. Distribution of radioactivity (% of applied) in loamy sand and silt loam soils treated with quinoxaline-labeled or phenyl-labeled [^{14}C]DPX-Y6202 at 2.6-3.9 oz ai/A between May and July, 1983.^a

Location/soil type	Date of appli- cation & rate	Sampling interval (months)	Sampling depth (inches)				Total [¹⁴ C] recovered	Cumulative precipitation (inches)
			0-2	2-4	4-8	8-end ^b		
Soil treated with quinoxaline-labeled [¹⁴ C]DPX-Y6202								
Fayetteville, NC Norfolk loamy sand	May 17, 1983 2.6 oz ai/A	0	103.2	0.7	0.5	0.2	104.6	0.6
		0.5	51.5	7.4	2.6	0.5	62.1	2.5
		1	49.2	10.5	6.4	0.9	67.0	6.1
		2	39.5	6.1	2.8	0.5	48.9	9.9
		4	33.3	5.7	3.5	0.4	42.8	16.4
		6	23.3	1.7	1.6	0.1	26.7	21.7
		12	26.8	3.6	4.1	0.8	35.4	56.4
Stoneville, MS Dundee silt loam	May 18, 1983 3.9 oz ai/A	0	87.4	7.0	0.3	0.1	94.8	0.6
		0.5	53.7	0.3	0.1	0.1	54.2	7.5
		1	49.2	2.2	0.3	0.8	52.5	10.8
		2	58.7	6.5	1.6	0.2	67.0	14.8
		4	53.1	5.0	5.1	0.1	63.3	18.5
		6	55.2	3.1	0.9	0.3	59.4	22.6
		12	51.8	3.1	0.6	0.1	55.6	61.9
Newark, DE Keyport silt loam	June 9, 1983 3.7 oz ai/A	0	99.3	ND ^c	ND	ND	99.3	0.6
		0.5	86.7	3.4	2.2	0.4	92.7	2.6
		1	70.8	5.7	3.3	0.3	80.1	3.6
		2	71.9	3.3	2.0	0.6	77.8	4.0
		4	64.1	1.8	1.1	1.1	68.1	9.1
		6	51.3	5.1	2.3	0.7	59.4	22.1
		12	50.4	4.0	2.5	1.6	58.5	48.3
Rochelle, IL Flanagan silt loam	May 16, 1983 3.7 oz ai/A	0	95.0	2.8	0.1	ND	97.9	0.6
		0.5	48.2	3.0	0.2	ND	51.4	2.3
		1	48.4	1.4	0.6	0.1	50.5	7.4
		2	68.1	19.9	0.6	0.1	88.7	18.0
		4	60.1	11.0	0.7	0.2	72.0	22.7
		6	79.4	2.0	0.9	0.2	82.5	31.1
		12	74.0	5.1	0.1	1.0	80.2	49.0
Soil treated with phenyl-labeled [¹⁴ C]DPX-Y6202								
Newark, DE Keyport silt loam	July 21, 1983 3.5 oz ai/A	0	88.4	ND	ND	0.1	88.5	0.6
		0.5	75.7	ND	ND	ND	75.7	1.0
		1	65.2	1.3	0.1	ND	66.6	2.0
		2	59.1	1.4	0.3	ND	60.9	3.7
		4	50.4	1.1	0.5	ND	52.1	15.8
		6	59.1	0.7	0.6	1.6	62.0	27.3
		16	31.8	0.3	0.2	0.5	32.8	66.0

^a The soil was contained within stainless steel tubes in the ground and then treated.

^b The study author stated that the total length of each cylinder of soil varied from 11-14 inches depending on the amount of compaction.

^c Not detected, the detection was not specified.

32

Table 3. DPX-Y6202 and its degradates (% of applied radioactivity) in loamy sand and silt loam soils treated with quin-oxaline-labeled [^{14}C]DPX-Y6202 (purity >99%).^a

Sampling interval (months)	DPX-Y6202	DPX-Y6202 acid	Phenol 1	Phenol 2	Hydroxy-Phenol 2	Unknown 1	Unknown 3	Polar degradates ^b	Unextractable [^{14}C]	Total [^{14}C] recovered
<u>Norfolk loamy sand soil in Fayetteville, NC, treated at 2.6 oz ai/A</u>										
0	22.7	42.3	4.1	3.1	3.1	6.2	2.1	19.6	3.0	106.2
0.5	3.7	13.6	3.7	2.4	12.6	3.7	2.1	6.0	10.7	58.5
1	3.1	4.8	2.5	1.3	14.7	5.2	3.2	8.3	19.5	62.6
2	2.8	2.6	1.8	1.0	12.4	3.4	2.3	4.3	17.8	48.4
4	0.8	1.9	0.6	1.0	8.1	2.6	2.6	4.1	18.6	40.3
6	0.2	1.0	0.6	0.8	4.8	1.8	1.4	2.2	11.8	24.6
12	0.7	1.1	1.0	1.1	4.6	2.2	1.9	1.9	12.5	27.0
<u>Dundee silt loam soil in Stoneville, MS, treated at 3.9 oz ai/A</u>										
0	9.1	64.6	2.8	1.9	3.0	5.0	2.8	4.6	4.7	98.6
0.5	1.4	26.2	2.7	1.4	2.3	5.9	1.8	3.7	7.5	52.6
1	1.2	17.7	3.0	2.0	2.8	5.5	1.6	7.0	11.6	52.4
2	1.7	14.4	2.5	0.9	4.1	7.0	3.4	5.0	22.0	61.1
4	0.9	7.4	1.5	1.0	13.3	4.9	2.6	2.4	27.1	61.0
6	1.2	6.2	1.5	0.8	10.0	3.8	2.5	2.8	21.7	50.7
12	1.0	7.0	1.5	1.0	10.2	3.5	2.7	2.0	21.1	49.9
<u>Keyport silt loam soil in Newark, DE, treated at 3.7 oz ai/A</u>										
0	24.7	66.3	0.1	0.1	0.1	0.1	0.1	0.2	8.3	99.3
0.5	3.2	17.3	3.2	3.3	26.8	5.7	0.2	4.4	24.7	88.7
1	1.6	12.0	2.0	1.7	20.0	4.0	2.8	0.2	24.5	83.6
2	4.4	4.6	1.9	2.2	27.4	3.1	1.4	0.2	21.1	66.1
4	0.8	5.1	1.5	2.6	19.4	4.2	2.2	0.2	30.2	66.0
6	0.3	3.2	0.8	0.8	16.1	4.8	1.3	5.5	17.3	50.1
12	1.2	4.6	0.9	0.8	14.5	4.0	1.2	3.6	20.1	50.9
<u>Flanagan silt loam soil in Rochelle, IL, treated at 3.7 oz ai/A</u>										
0	47.9	36.9	1.8	0.9	1.8	1.8	0.9	1.8	1.3	95.1
0.5	2.3	12.6	1.8	1.8	5.9	6.3	2.3	12.2	3.4	48.6
1	1.3	10.1	2.1	1.7	8.8	6.8	2.5	10.2	4.3	47.3
2	2.8	27.0	6.6	2.3	20.3	7.7	2.9	6.2	12.8	88.6
4	2.0	17.2	4.3	1.6	19.6	4.9	2.3	2.8	14.0	68.7
6	1.7	13.3	4.1	2.3	25.5	6.4	0.1	4.7	19.1	77.1
12	1.7	14.4	5.8	2.3	23.1	5.2	3.5	2.9	17.9	76.8

^a Results represent analysis of soil segments that contained >5% of the applied radioactivity.

^b Radioactivity remaining at the origin of the TLC plates.

33

Table 4. DPX-Y6202 and its degradates (% of applied radioactivity) following the application of phenyl-labeled [^{14}C]DPX-Y6202 (purity >99%) at 3.5 oz ai/A to Keyport silt loam soil located in Newark, DE.^a

Sampling interval (months)	DPX-Y6202	DPX-Y6202 acid	Phenol 1	Phenol 3	Phenol 4	Unknown 1	Unknown 2	Polar degradates ^b	Unextractable [^{14}C]	Total [^{14}C] recovered
0	25.9	46.8	1.9	2.3	3.8	1.4	1.1	1.2	1.3	85.7
0.5	8.6	40.4	2.8	0.7	6.4	3.6	0.9	2.8	10.2	76.4
1	7.6	24.6	0.7	0.3	6.8	5.4	2.1	3.6	10.8	61.9
2	5.1	20.5	1.9	0.7	9.6	4.4	0.3	2.0	15.6	60.1
4	4.4	18.0	1.5	0.6	7.9	3.6	0.6	2.0	11.0	49.6
6	5.4	18.4	2.8	0.5	8.2	4.2	0.4	1.9	17.2	59.0
16	2.8	8.0	0.9	0.4	2.2	2.4	0.6	0.9	15.9	34.1

^a Results represent analysis of soil segments that contained >5% of the applied radioactivity.

^b Radioactivity remaining at the origin of the TLC plates.

34

EXECUTIVE SUMMARY

The data summarized here are scientifically valid data that have been reviewed in this report but do not fulfill data requirements unless noted in the Recommendations section of this report.

Based on batch equilibrium studies, quinoxaline-labeled [^{14}C]DPX-Y6202 acid, at 0.03-0.5 ppm, was very mobile in two sandy loam soils and mobile in two silt loam soils (Priester, 1985). Freundlich K_{ads} values were 1.5-1.9 and 16-20 for the sandy loam and silt loam soils, respectively; K_{oc} values were 0.36-0.66 and 1.1-1.2; and K_{des} values were 0.25 and 0.32-0.33. Based on soil TLC studies, [^{14}C]DPX-Y6202 acid was mobile (R_F 0.17-0.35) in two sandy loam soils and had low mobility (R_F 0.07-0.12) in two silt loam soils.

[^{14}C]DPX-Y6202 residues were mobile (10-23% of applied radioactivity in leachate) in 12-inch columns of sandy loam soil treated with unaged, quinoxaline-labeled [^{14}C]DPX-Y6202 and leached with 20 inches of water (Monson, 1985). [^{14}C]Residues were less mobile (<1% of applied in leachate) in columns of silt loam soil. Parent DPX-Y6202 was detected primarily in the top 2 inches of the soil columns, while the primary degradate, DPX-Y6202 acid, was found throughout the soil columns and comprised 95-97% of the recovered radioactivity in the sandy loam soil leachate extracts. Aged (30-day) DPX-Y6202 residues were mobile (27% of applied in leachate) in Woodstown sandy loam soil. Parent DPX-Y6202 comprised 7% of the recovered radioactivity in the soil extracts, while the primary degradate, DPX-Y6202 acid, comprised 62-75% and 95% of the recovered in the soil and leachate extracts, respectively.

RECOMMENDATIONS

Available data are insufficient to fully assess the environmental fate of and the exposure of humans and nontarget organisms to DYX-Y6202. The submission of data relevant to registration requirements (Subdivision N) for terrestrial food crop and terrestrial nonfood use sites is summarized below:

Hydrolysis studies: No data were submitted for this addendum; however, based on previously submitted data (Cadogan, 1983), no additional data are required.

Photodegradation studies in water: No data were submitted for this addendum; however, based on previously submitted data (Ryan, 1985), no additional data are required.

Photodegradation studies on soil: One study (Ryan, 1985) was reviewed but it does not satisfy data requirements. Because of the <1 day half-life, the sampling procedure (time intervals) used during the experiment and the 16 hour thawing/drying of soil samples were inappropriate. Also, this study would not satisfy data requirements because wavelengths <290 nm were not filtered and temperatures were 37-38°C. All data are required.

Photodegradation studies in air: No data were submitted for this addendum, but no data are required.

Aerobic soil metabolism studies: No data were submitted for this addendum; however, based on previously submitted data (Cadwgan and McFetridge, 1985), no additional data are required.

Anaerobic soil metabolism studies: No data were submitted for this addendum, but all data are required.

Anaerobic aquatic metabolism studies: No data were submitted for this addendum; however, no data are required because DPX-Y6202 has no aquatic or aquatic impact uses.

Aerobic aquatic metabolism studies: No data were submitted for this addendum; however, no data are required because DPX-Y6202 has no aquatic or aquatic impact uses.

Leaching and adsorption/desorption studies: Two studies were reviewed and both are scientifically valid. One study (Monson, 1985) does not fulfill data requirements because the length of time it took to leach the soil columns was not reported; K_d values were not reported; degradate characterization results were presented as percent of recovered rather than percent of applied and extraction efficiencies were not reported; and, for the aged soil column, the test substance was aged for longer than one half-life and the aged residues were not characterized prior to leaching. The second study (Priester, 1985) contributes toward the fulfillment of data requirements by providing information on the mobility of the primary degradate, DPX-Y6202 acid, in four soils (two sandy loam and two silt loam soils). Based on this study and previously submitted data (Priester, 1985; Wakabayashi, Hirata, and Takano, 1985; Wakabayashi, Hirata, and Takano, 1985), acceptable data have been provided on the mobility of unaged DPX-Y6202 in four soils and the mobility of its primary degradate. The requirement for a study using aged DPX-Y6202 is not pertinent because the half-life of DPX-Y6202 is <1 day; therefore, all mobility studies result in the use of aged material. No additional data are required.

Laboratory volatility studies: No data were submitted for this addendum, but all data are required.

Field volatility studies: No data were submitted for this addendum. The data requirement is deferred pending the receipt of acceptable laboratory volatility data.

Terrestrial field dissipation studies: One study (Cadwgan and Atkins, 1985) was reviewed and does not meet requirements, because an inappropriate procedure was used. Because of the short half-life of the test chemical, 16 hour drying of the soil samples allowed degradation of the parent material to occur. In addition, this study would not fulfill data requirements because the dissipation of DPX-Y6202 from cylinders in the field may not be representative of dissipation under actual use conditions, the test substance was not a typical end-use product, pretreatment soil samples were not collected and analyzed, and field test data were incomplete. All data are required.

Aquatic field dissipation studies: No data were submitted for this addendum; however, no data are required because DPX-Y6202 has no aquatic or aquatic impact uses.

Forestry dissipation studies: No data were submitted for this addendum; however, no data are required because DPX-Y6202 has no forestry use.

Dissipation studies for combination products and tank mix uses: No data were submitted for this addendum; however, no data are required because data requirements for combination products and tank mix uses are currently not being imposed.

Long-term field dissipation studies: No data were submitted for this addendum; however, all data may be required unless soil residues reach 50% dissipation prior to recommended subsequent application to the same site, or if aerobic soil metabolism studies demonstrate that residues are >50% of initial application at the time of subsequent application.

Confined accumulation studies on rotational crops: No data were submitted for this addendum, but all data are required.

Field accumulation studies on rotational crops: No data were submitted for this addendum. The data requirement is deferred pending the results of confined rotational crop accumulation studies.

Accumulation studies on irrigated crops: No data were submitted for this addendum; however, no data are required because DPX-Y6202 does not have an aquatic food crop or aquatic noncrop use, is not used in and around holding ponds used for irrigation purposes, and has no use involving effluents or discharges to water used for crop irrigation.

Laboratory studies of pesticide accumulation in fish: No data were submitted for this addendum; however, based on previously submitted data (Hutton and Kasprcak, 1983), no additional data are required.

Field accumulation studies on aquatic nontarget organisms: No data were submitted for this addendum; however, no data are required because DPX-Y6202 has no forestry, aquatic noncrop, or aquatic impact uses.

Reentry studies: No data were submitted for this addendum, and no data are required at this time. However, data may be required if in toxicity category I or if there are other toxicological concerns, e.g., oncogenicity, teratogenicity, or others. Hand harvested crop use(s) plus toxicity concerns will trigger re-entry requirements for dislodgeable residue data.

Groundwater Contamination: Preliminary data (not acceptable for registration) indicate that because of the persistence of the major degradate (DPX acid) and mobility in most soils, there may be a potential for groundwater contamination. When acceptable data are received, a final decision will be made.

REFERENCES The following studies are new submittals reviewed in this report:

Cadwgan, G.E. and B. Atkins. 1985. Field soil dissipation [phenyl-¹⁴C(U)] and [quinoxaline-¹⁴C]DPX-Y6202 in Delaware, North Carolina, Illinois and Mississippi. Report No. AMR-333-85. Unpublished study prepared and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

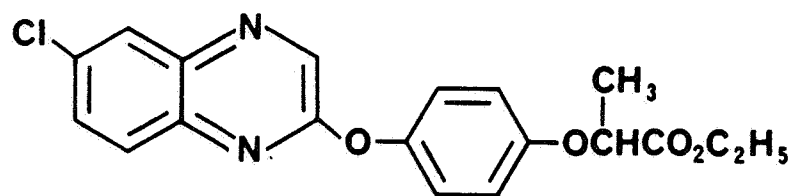
Monson, K.D. 1985. Soil column leaching behavior of [quinoxaline-¹⁴C]DPX-

Y6202. Report No. AMR-357-85. Unpublished study prepared and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

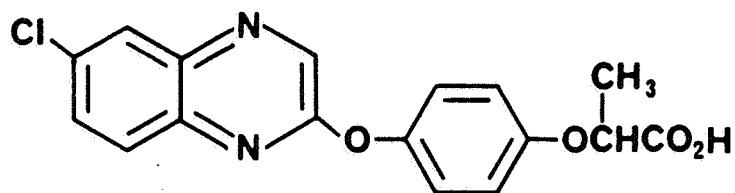
Priester, T.M. 1985. Batch equilibrium (adsorption/desorption) and soil thin-layer chromatography studies with [quinoxaline-¹⁴C]2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy]propanoic acid ("DPX-Y6202 acid"). Report No. AMR336-85. Unpublished study prepared and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

Ryan, D.L. 1985. Photodegradation of [quinoxaline-¹⁴C] DPX-Y6202 on soil. Report No. AMR-289-84. Unpublished study prepared and submitted by E.I. du Pont de Nemours and Co., Inc., Wilmington, DE. Acc. No. 073771.

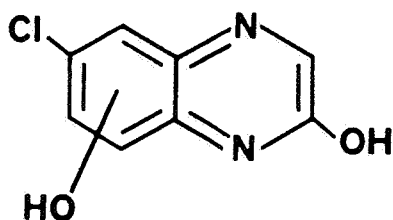
APPENDIX
DPX-Y6202 AND ITS DEGRADATES



Ethyl 2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy]propanoate
(DPX-Y6202)

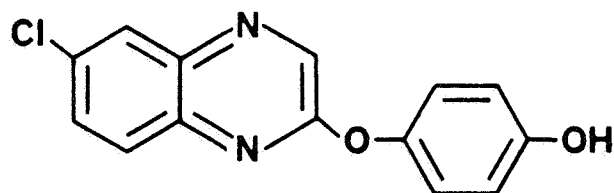


2-[4-(6-Chloroquinoxalin-2-yloxy)phenoxy]propanoic acid
(DPX-Y6202 acid)

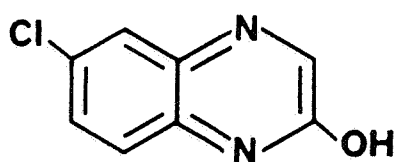


Hydroxylated 6-chloroquinoxaline-2-ol
(Hydroxy-phenol 2)

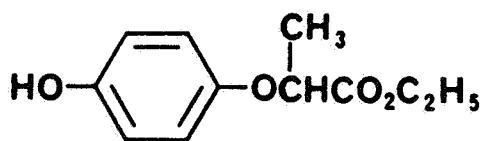
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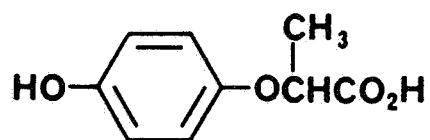
4-(6-Chloroquinoxalin-2-yloxy)phenol
(Phenol 1)



6-Chloroquinoxalin-2-ol
(Phenol 2)



Ethyl-2-[(4-hydroxyphenyl)oxy]propanoate
(Phenol 3)



2-[(4-Hydroxyphenyl)oxy]propanoic acid
(Phenol 4)

41