

US EPA ARCHIVE DOCUMENT

Pesticide Chemical No. 084301
and 104201

Date out of EAB: SEP 16 1986

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

From: Samuel M. Creeger, Chief *SMC*
Review Section #1
Exposure Assessment Branch
Hazard Evaluation Division (TS 769)

Attached, please find the EAB review of...

Reg./File # : 1471-148

Chemical Name: Benefin and Oryzalin

Type Product : Herbicide

Product Name : not applicable

Company Name : Eli Lilly and Company

Purpose : registration support

Date received: 2/13/86

Action Code(s): 305

Date completed: SEP 16 1986

EAB # (s) : 6353

days : 2.0

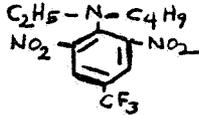
Deferrals to: _____ Ecological Effects Branch
_____ Residue Chemistry Branch
_____ Toxicology Branch

Monitoring study requested by EAB:

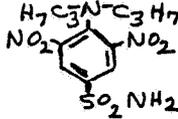
Monitoring study voluntarily conducted by registrant:

1. CHEMICAL

chemical name: N-Butyl-N-ethyl- α, α, α -trifluoro-2,6-dinitro-p-toluidine
 common name: Benefin (obsolete), Benfluralin (ISO)
 CAS #: 1861-40-1
 PC #: 084301
 structure:



chemical name: 3,5-Dinitro-N⁴,N⁴-dipropylsulfonilamide
 common name: Oryalin
 CAS #: 19044-88-3
 PC #: 104201
 structure:

2. TEST MATERIAL

described in individual studies

3. STUDY/ACTION TYPE

submission of data in support of registration - use not specified

4. STUDY IDENTIFICATION

Hydrolysis of the Herbicide Benefin in Aqueous Buffer Solution. D.G. Saunders, S.K. Smith, and J.W. Mosier. Agricultural Analytical Chemistry, Lilly Research Laboratories, Division of Eli Lilly and Company, Greenfield, IN, 46140. Feb., 1985. EPA acc. no. 257843.

Dissipation of ¹⁴C Benefin in Soils Maintained Under Aerobic Conditions. D.F. Berard. Agricultural Biochemistry, Lilly Research Laboratories, Division of Eli Lilly and Company, Greenfield, IN, 46140. Mar., 1985. EPA acc. no. 257843.

Dissipation of ¹⁴C Oryalin in Soils Maintained Under Aerobic Conditions. D.F. Berard. Agricultural Biochemistry, Lilly Research Laboratories, Division of Eli Lilly and Company, Greenfield, IN, 46140. Mar., 1985. EPA acc. no. 257843.

5. REVIEWED BY:

Typed Name: E. Brinson Conerly
 Title: Chemist, Review Section 1
 Organization: EAB/HED/OPP

EBC for

6. APPROVED BY:

Typed Name: Samuel M. Creeger
 Title: Chief, Review Section 1
 Organization: EAB/HED/OPP

Samuel M Creeger

SEP 16 1986

7. CONCLUSIONS:

The following are data requirements for these active ingredients, and their status:

Benefin:

hydrolysis	satisfied, but see below
aqueous photolysis	not satisfied
soil photolysis	not satisfied
aerobic soil metabolism	not satisfied
anerobic soil metabolism	not satisfied
leaching	not satisfied
field dissipation	not satisfied
rotational crops	not satisfied
fish accumulation	not satisfied

Oryzalin:

hydrolysis	satisfied, but see below
aqueous photolysis	not satisfied
soil photolysis	not satisfied
aerobic soil metabolism	not satisfied
anerobic soil metabolism	not satisfied
leaching	not satisfied
field dissipation	not satisfied
rotational crops	not satisfied
fish accumulation	not satisfied

These three studies were reviewed in July 1985, and the two^{on} aerobic soil metabolism were rejected at that time. This reviewer concurs in this opinion, and further believes that the hydrolysis study on benefin is not acceptable without further information, for reasons stated below. The oryzalin hydrolysis study may have the same deficiencies.

8. RECOMMENDATIONS:

The applicant should submit acceptable studies for the outstanding data requirements, and clarifying information on the hydrolysis study.

9. BACKGROUND: not applicable10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES

10.1

A. STUDY IDENTIFICATION

Hydrolysis of the Herbicide Benefin in Aqueous Buffer Solution. D.G. Saunders, S.K. Smith, and J.W. Mosier. Agricultural Analytical Chemistry, Lilly Research Laboratories, Division of Eli Lilly and Company, Greenfield, IN, 46140. Feb., 1985. EPA acc. no. 257843.

B. MATERIALS AND METHODS (Protocols)

test material-- analytical standard benefin, synthesized and analyzed by the submitters.

stock solution-- 100 ug/ml benefin in acetonitrile

test buffers-- pH 5, 7, 9 in distilled H₂O, prepared from 0.1 M acetic acid, KH₂PO₄, and NaHCO₃, adjusted with 0.1 M NaOH.

sterilization procedure-- test ampules with buffer were autoclaved @ 121°C 20 minutes.

test procedure-- 0.01 ml stock solution was added to 20 ml buffer per ampule, and immediately flame sealed, a total of 10 ampules per treatment. Controls contained buffer and 0.01 ml acetonitrile, a total of five ampules per treatment. Hydrolysis was carried out in the dark @ a nominal temperature of 25°C, which was measured at 26.1° (range 26.0-26.5°)

sampling times-- 0, 7, 15, 23, and 30 days following initiation of the test

replication-- two test and one "blank" control per sampling period

additional controls-- two freshly prepared 1.0 ug ampules per sampling period

analytical procedure-- The hydrolysis solution was transferred by washing with 50 ml 5% aqueous NaCl then 5 ml MeOH, and partitioned with 2x 20 ml Dichloromethane (DCM). The DCM extract was taken to dryness by rotary evaporation, redissolved in 10 ml toluene, and analyzed by electron capture gas chromatography.

C. REPORTED RESULTS

No significant hydrolysis was observed over the thirty day period at any pH tested.

D. STUDY AUTHOR'S CONCLUSION/QUALITY ASSURANCE MEASURES

Hydrolysis is not a means of degradation of benelin in the environment.

E. REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS

The study is not sufficiently well-reported to satisfy this data requirement, although the results and conclusion may be correct. There are the following deficiencies:

- 1) Although this is not an absolute requirement, radiolabelled studies are highly preferred due to their sensitivity. This study was done with unlabelled material.
- 2) The description of the buffers is insufficient-- we can guess what the final concentrations are, but they are not specified. The applicant should supply this information. Note that phosphate buffer was apparently used, but did not contribute significantly to the compound's hydrolysis.
- 3) The precision and sensitivity of the analytical method are not well characterized. By our examination of the data in Table I (see CBI appendix), we conclude that the precision is + 2.34%, with a range of 0.4 to 5.9% for individual replicates. Recoveries average 89.12%, with a range of 75.0 to 100.9 % for individual replicates. The data in Table II (see CBI appendix) indicate 98.8% recovery (range of 86 to 124%), with precision of + 8.50%. The applicant should clarify this

point.

- 4) It is not indicated whether the data in Table II are corrected for the "recovery" controls, since we do not have the raw data. The applicant should provide this information.
- 5) The temperature of the incubation room is not well described. The narrative seems to indicate that temperature was only measured when samples were added or removed. This infrequent monitoring of temperature is unacceptable. The applicant should supply any clarifying information.

With the above clarifying information, this study may be acceptable.

10.2

A. STUDY IDENTIFICATION

Dissipation of ¹⁴C Benfen in Soils Maintained Under Aerobic Conditions. D.F. Berard. Agricultural Biochemistry, Lilly Research Laboratories, Division of Eli Lilly and Company, Greenfield, IN, 46140. Mar., 1985. EPA acc. no. 257843.

E. REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS

The study is deficient, and has been rejected by a previous reviewer. Noted deficiencies are as follows:

- 1) We need the history of the pesticide treatment of the test soils.
- 2) The material balance on sandy loam soil and silty loam soils is unsatisfactory for the last portion of the study. Volatile products may have formed which have not been accounted for, which may comprise as much as 15-25% of the originally applied radioactivity.
- 3) The author has stated two different half-life projections, one in the "Results" section, and one in the "Conclusions" section.
- 4) Our projected half lives, based on linear regression of the data, are somewhat longer than the author's-- 3.6, 6.0, and 13.4 weeks respectively. The author should provide a description of the "Marquardt" technique which he used to derive these figures.

10.3

A. STUDY IDENTIFICATION

Dissipation of ¹⁴C Oryzalin in Soils Maintained Under Aerobic Conditions. D.F. Berard. Agricultural Biochemistry, Lilly Research Laboratories, Division of Eli Lilly and Company, Greenfield, IN, 46140. Mar., 1985. EPA acc. no. 257843.

E. REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS

The study is deficient, and has been rejected by a previous reviewer. Deficiencies are similar to those mentioned in 10.2.

11. COMPLETION OF ONE-LINER: no information added

12. CBI APPENDIX: (if applicable): included

CONFIDENTIAL APPENDIX

TABLE I
Recovery of Benefin from Buffer Solution

87.79
82.0
97.0
99.1
99.1

pH	Time (Days)	Percent Recovery			Standard Deviation
		A	B	Mean	
5	0	79.5	84.4	82.0	2.4
	7	90.0	81.7	85.9	4.2
	15	94.9	99.1	97.0	2.1
	23	80.4	75.0	77.7	2.7
	30	98.4	94.5	96.4	4.0
				87.8	8.7
7	0	77.7	75.2	76.5	1.3
	7	86.4	88.1	87.3	0.9
	15	90.6	97.4	94.0	3.4
	23	94.6	90.1	92.4	2.3
	30	95.4	88.5	92.0	3.4
				88.4	7.2
9	0	73.3	85.1	79.2	5.0
	7	88.3	86.7	87.5	0.8
	15	98.3	99.1	98.7	0.2
	23	100.0	100.9	100.5	0.5
	30	89.2	90.8	90.0	0.8
				91.2	8.7

8.7 8.66 range (75-

7.22 (75-

8.7 (733-105

$2.3^2 = 1.6$

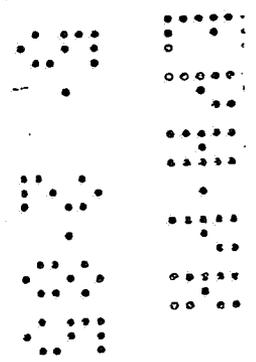


TABLE II

Hydrolysis of Benefin in Aqueous Buffer

pH	Time (Days)	Benefin Concentration ($\mu\text{g/ml}$)			Percent of Initial
		A	B	Mean	
5	0	0.048	0.050	0.049	100
	7	0.048	0.046	0.047	96
	15	0.051	0.049	0.050	102
	23	0.055	0.062	0.058	118
	30	0.043	0.048	0.046	94
7	0	0.054	0.054	0.054	100
	7	0.054	0.052	0.053	98
	15	0.048	0.051	0.050	93
	23	0.049	0.050	0.050	93
	30	0.049	0.047	0.048	89
9	0	0.052	0.042	0.047	100
	7	0.046	0.043	0.044	94
	15	0.049	0.050	0.050	106
	23	0.051	0.041	0.046	98
	30	0.050	0.049	0.050	106

0.050
 ± 0.0012

985 ± 3
 (86 - 124)

0.051
 ± 0.0026

0.049
 ± 0.0042

± 0.001

0.047
 0.040