

US EPA ARCHIVE DOCUMENT

Shaughnessy No.: 056502

Date Out of EFGWB: DEC 6 1989

To: Susan Lewis
Acting Product Manager #21
Fungicide-Herbicide Branch
Registration Division (H7505C)

From: Emil Regelman, Supervisory Chemist
Environmental Chemistry Review Section #2
Environmental Fate and Ground Water Branch/EFED (H7507C)

Thru: Henry Jacoby, Chief
Environmental Fate and Ground Water Branch/EFED (H7507C)

Attached, please find the EFGWB review of . . .

Reg./File # : 005481-00197

Common Name : PCNB (pentachloronitrobenzene)

Type Product : Fungicide

Product Name : PCNB

Company Name : Amvac Chemical Corporation

Purpose : Addendum to the PCNB Registration Standard

Date Received : 8/23/89 EFGWB # (s): 90733

Action Code : 660

Deferrals to: Ecological Effects Branch, EFED
 Science Integration and Policy Staff, EFED
 Non-Dietary Exposure Branch, HED
 Dietary Exposure Branch, HED
 Toxicology Branch I, HED
 Toxicology Branch II, HED

1. CHEMICAL: Common name:

PCNB

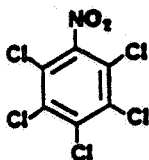
Chemical name:

Pentachloronitrobenzene

Other name(s):

None

Structure:



Formulations:

10-40% D, 75% WP, 2-30% G, 23.4-26.5% EC, 20% FlC, and
20-25% RTU-L

Physical/Chemical properties:

Molecular formula : C₆Cl₅NO₂
Molecular weight : 295.3
Physical state : colorless needles
Density at 25 C : 1.718
Solubility (25 C) : practically insoluble in water,
soluble in benzene and chloroform,
20 g/kg in ethanol.
Vapor pressure : 1.8 Pa at 25 C
Melting point : 146 C

2. TEST MATERIAL:

Active ingredient

3. STUDY/ACTION TYPE:


Addendum to the PCNB Registration Standard

4. STUDY IDENTIFICATION:

Burgess, D. 1989. Uptake, depuration and bioconcentration of ¹⁴C-PCNB by bluegill sunfish (*Lepomis macrochirus*). ABC Final Report #36872. Unpublished study performed by Analytical Bio-Chemistry Laboratories, Inc. and submitted by Amvac Chemical Corp., Los Angeles, CA. (41200000)

5. REVIEWED BY:

P. Datta
Chemist
Review Section #2
EFGWB/EFED/OPP

Signature: 

Date: 12/4/89

6. APPROVED BY:

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

Signature: 

Date: DEC 6 1989

7. CONCLUSIONS:

EFGWB cannot accept this study on fish accumulation (165-4) of PCNB because the registrant did not characterize radiolabeled residues in fish tissues and water. Furthermore, this study did not meet the data requirements stated in Subdivision N of the Guidelines. (For details, see the comments cited in the attached DER).

8. RECOMMENDATION:

RD should inform the registrant to correct the discrepancies noted in the comment section of the attached DER on the fish accumulation study (165-4).

9. BACKGROUND:

On 8/14/89, Amvac Chemical Corporation (registrant) submitted a fish accumulation study (165-4) of PCNB to support data requirements for continued registration of PCNB. The registrant requested the Agency review this study.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

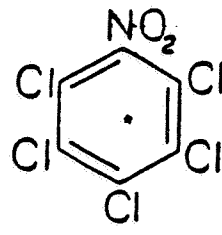
N/A.

11. COMPLETION OF ONE-LINER:

See attached one-liner.

12. CBI APPENDIX:

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



ENVIRONMENTAL FATE & GROUND WATER
PESTICIDE ENVIRONMENTAL FATE ONE LII

Common Name: **PENTACHLORONITROBENZENE**
Chem. Name : **PENTACHLORONITROBENZENE**

Date: 09/07/89

Shaugh. # : 56502
Type Pest. : Fungicide
Formulation: WP; EC; GRANULES; RTU = 24% SOLUTION
Uses : SOIL FUNGICIDE/SEED DRESSING

CAS Number: 82-68-8

Empir. Form: C₆Cl₅N₁O₂
Mol. Weight: 295.3
Solub.(ppm). 0.44 @ 20 C

VP (Torr): 1.13E-4
Log Kow : 5.45
Henry's : 1.0E-4

Hydrolysis (161 1)
pH 5:[*] STABLE
pH 7:[*] STABLE
pH 9:[*] STABLE
PH :[]
PH :[]
PH :[]

Photolysis (161-2 -3, -4)
Air []
Soil :[*] 80 DAYS ON SdLm; Xe ARC
Water:[#] 4 DAYS Xe ARC
:[]
:[]
:[]

MOBILITY STUDIES (163-1)

Soil Partition (Kd)
1.[] Koc 1.4E4
2.[]
3.[]
4.[]
5.[]
6.[]

Rf Factors
1.[#] 0.00 IN HAGERSTOWN SiClLm
2.[#] RELATIVELY IMMOBILE IN SiLm,
3.[] SAND, AND SdLm
4.[]
5.[]
6.[]

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

Aerobic Soil (162-1)
1.[#] 4.7 MONTHS IN SANDY LOAM
2.[#] 7.6 " " CLAY
3.[#] 9.7 " " MUCK
4.[#] 4 MONTHS IN SANDY CLAY LOAM
5.[]
6.[]
7.[]

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

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

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

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

Common Name: **PENTACHLORONITROBENZENE**

Date: 09/07/89

VOLATILITY STUDIES (163-2,3)

- Laboratory:
- Field.

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

Terrestrial Field (164-1)

- 1.[#] IN 22 POTATO FIELDS IN DENMARK, T1/2 AVGD. 434 DAYS WITH
- 2.[] RANGE OF 117 TO 1059 DAYS.
- 3.[]
- 4.[]
- 5.[]
- 6.[]

Aquatic (164-2)

- 1.[]
- 2.[]
- 3.[]
- 4.[]
- 5.[]
- 6.[]

Forestry (164-3)

- 1.[]
- 2.[]

Other (164-5)

- 1.[]
- 2.[]

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

Confined Rotational Crops (165-1)

- 1.[]
- 2.[]

Field Rotational Crops (165-2)

- 1.[]
- 2.[]

Irrigated Crops (165 3)

- 1.[]
- 2.[]

Fish (165 4)

- 1.[#] BLUEGILL SUNFISH BCF: 1043 X FOR WHOLE FISH. DEPURATION
- 2.[] WAS FAIRLY RAPID.

Non-Target Organisms (165-5)

- 1.[]
- 2.[]

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

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

Page 3

Common Name: **PENTACHLORONITROBENZENE**

Date: 09/07/89

GROUND WATER STUDIES (158.75)

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

DEGRADATION PRODUCTS

1. PENTACHLOROANILINE
2. PENTACHLOROTHIOANISOLE
3. TECNAZENE
4. PENTACHLOROBENZENE
5. HEXACHLOROBENZENE
- 6.
- 7.
- 8.
- 9.
- 10.

COMMENTS

References: ODW HA,
Writer : RWH

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

PCNB ADDENDUM

TASK 1: REVIEW AND EVALUATION OF INDIVIDUAL STUDIES

November 21, 1989

Final Draft Report

Contract No. 68D90058

Submitted to:
Environmental Protection Agency
Arlington, VA 22202

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

DATA EVALUATION RECORD

STUDY 1

CHEM 056502

PCNB

§165-4

FORMULATION--00--ACTIVE INGREDIENT

STUDY ID 41200000

Burgess, D. 1989. Uptake, depuration and bioconcentration of ¹⁴C-PCNB by bluegill sunfish (Lepomis macrochirus). ABC Final Report #36872. Unpublished study performed by Analytical Bio-Chemistry Laboratories, Inc. and submitted by Amvac Chemical Corp., Los Angeles, CA.

DIRECT REVIEW TIME - 12

REVIEWED BY: E. Hirsh

TITLE: Staff Scientist

EDITED BY: J. Harlin

Jean Harlin

TITLE: Staff Scientist

APPROVED BY: W. Spangler

W. Spangler

TITLE: Project Manager

ORG: Dynamac Corporation
Rockville, MD

TEL: 468-2500

APPROVED BY: P. Datta

TITLE: Chemist

ORG: EFGWB/EFED/OPP

TEL: 557-9733

SIGNATURE:

P. Datta - 12/4/89

CONCLUSIONS:

Laboratory Accumulation - Fish

1. This study cannot be used to fulfill data requirements at this time.
2. PCNB residues (uncharacterized) accumulated in bluegill sunfish exposed to [¹⁴C]PCNB at 1.0 ppb for 35 days. The maximum mean bio-concentration factors were 400x in the edible tissues, 1800x in the nonedible tissues and 1100x in the whole fish. At the end of the 21-day depuration period, 78% of the accumulated [¹⁴C]residues were eliminated from the edible and nonedible tissues and 82% were eliminated from whole fish.
3. This study is scientifically sound, but does not meet Subdivision N guidelines for the following reason:

radioactive residues in the fish tissues and water were not characterized.

4. In order for this study to fulfill the accumulation in laboratory fish data requirement, data concerning identification of the residues in fish tissues and test water must be submitted.

METHODOLOGY:

Flow-through aquatic exposure systems were prepared using two 100-L aquaria. Aerated well water (19-24 C, pH 7.8-8, dissolved oxygen content 7.3-8.5 mg/L or 71-99% saturation, total hardness 260-290 mg/L as CaCO₃, alkalinity 290-300 mg/L as CaCO₃; Table 2) was provided to each aquarium at a rate of 330 mL/minute, which is equal to 6.8 turnovers per day. One aquarium was continuously treated with uniformly ring-labeled [¹⁴C]pentachloronitrobenzene (PCNB, radiochemical purity 98.6%, specific activity 46.4 uCi/mmol) at a nominal concentration of 1.0 ppb; the second aquarium served as an untreated control. The aquaria were immersed in a water bath maintained at 22 ± 2 C. The test systems were allowed to equilibrate prior to the introduction of the fish, and water samples from both aquaria were collected before the introduction of the fish.

Bluegill sunfish (Lepomis macrochirus; mean length 66 mm; mean weight 10 g) were held in culture tanks on a 16-hour photoperiod for 14 days prior to the initiation of the study. Then, 120 fish were transferred into each of the two aquaria. The fish were fed commercial fish food ad libitum. Following a 35-day exposure period, the water in the treated aquarium was siphoned down to a depth of 8 cm, and replaced with approximately 70 L of uncontaminated well water. The fish were maintained in the aquarium for a 21-day depuration period, during which the flow-through water was uncontaminated well water. Fish (6, 15, or 25) and water (0.5 or 1 L) samples were taken from each aquarium after 0.17, 1, 3, 7, 14, 21, 28, and 35 days of exposure. During the depuration period, water and fish were sampled on days 1, 3, 7, 10, 14, and 21. Fish samples were stored frozen for an unspecified period of time prior to analysis.

Radioactivity in the water samples was quantified using LSC; the limit of detection was 0.065 ppb. Three fish from each sampling interval were dissected into edible (body, muscle, skin, skeleton) and nonedible (fins, head, internal organs) portions and pooled accordingly. Duplicate samples of the pooled edible and nonedible tissues, and three additional whole fish samples from each sampling interval were analyzed for total radioactivity by LSC following combustion. Recovery efficiencies from edible, nonedible, and whole fish samples fortified with [¹⁴C]PCNB ranged from 94 to 103% (Table 8). Detection limits were 3.13, 3.19, and 3.26 ppb for edible, whole fish, and nonedible portions, respectively.

DATA SUMMARY:

PCNB (pentachloronitrobenzene) residues (uncharacterized) accumulated in bluegill sunfish exposed to [¹⁴C]PCNB (radiochemical purity 98.6%, specific activity 46.4 uCi/mmmole) at a nominal concentration of 1.0 ppb for 35 days under flow-through conditions. The maximum mean bioconcentration factors were 400x in the edible tissues, 1800x in the nonedible tissues, and 1100x in the whole fish (Table 4). Maximum mean concentrations of total [¹⁴C]residues occurred at 35 days and were 350 ppb in edible tissues, 1600 ppb in nonedible tissues, and 930 ppb in the whole fish. The mean concentration of [¹⁴C]residues in the water during the exposure period was 0.88 ppb. After 21 days of depuration, 78% of the accumulated [¹⁴C]residues were eliminated from the edible and nonedible tissues and 82% were eliminated from whole fish (Table 5).

Throughout the study, the water temperature ranged from 20 to 22 C, the pH ranged from 7.7 to 8.2, and the dissolved oxygen content ranged from 6.6 to 8.3 mg/L (Table 9). Total [¹⁴C]residues in the treated water ranged from 0.47 to 1.2 ppb during the exposure period (Table 4).

COMMENTS:

1. Radioactive residues in the fish tissues and water were not characterized. Additional samples of fish were collected on days 21 and 35 of the uptake portion of the study from each aquarium, dissected into edible and nonedible portions, and stored frozen for metabolite characterization; however, no characterization of metabolites was presented in this study.
2. The registrant obtained bioconcentration factors by dividing the tissue concentration by the mean measured water concentration up to and including the respective sampling day.
3. No abnormal behavior or mortality was observed in the fish during the study.
4. A preliminary 14-day toxicity study was conducted to determine the acute toxicity of PCNB to bluegill sunfish. The 14-day LC₅₀ value was 0.054 ppm and the no-effect level was 0.012 ppm. In view of these results, the study author chose an exposure level of 1 ppb for the bioconcentration study.

PCNB science review

Page _____ is not included in this copy.

Pages 11 through 17 are not included in this copy.

The material not included contains the following type of information:

- Identity of product inert ingredients
 - Identity of product impurities
 - Description of the product manufacturing process
 - Description of product quality control procedures
 - Identity of the source of product ingredients
 - Sales or other commercial/financial information
 - A draft product label
 - The product confidential statement of formula
 - Information about a pending registration action
 - FIFRA registration data
 - The document is a duplicate of page(s) _____
 - The document is not responsive to the request
-

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.
