File - 109301
9-27-89

Note To Steven Schatzow

This is to update you on the Pydrin® rotational crop plant back time restrictions for root crops. As you are aware we expeditied reviews of the rotational crop data from Shell Chemical Co. in EAB. The review was to have been finished by February 15th.

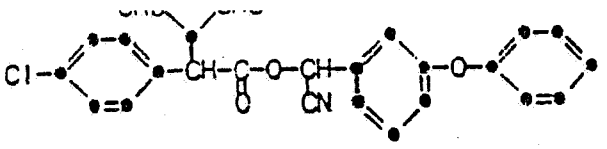
The review was completed on time but the reviewer found gaps in the information and Shell was asked to fill those gaps. It took about ten days to get the new information and have it reviewed. While that was being done a reviewer in CDFA called our reviewer in EAB and indicated that the study we were looking at gave California some concern since the study was produced in New Jersey under environmental conditions very different than the California situation. (During the N. J. test there had been two three inch rains and the CDFA chemist thought the test may not reflect a useful picture of what may happen in arid conditions such as in California.) In trying to break this impasse, Herb Harrison and Dave Severn, together with the EAB reviewer, called the CDFA twice to compare data reviews and procedures. Those discussions have revealed that CDFA has a sugar beet study showing that significant residues of 2.4 ppm Pydrin® occurs at 40 and 72 days in the whole (tops and roots) immature sugar beet.

We contacted Ed Hobson of Shell on 3/12/86 and ask him to send in this study since it is pivotal to our decision. Ed Hobson indicated that the study had been submitted to EPA in 1982 and that he does not recall significant residues of 2.4 ppm. He provided us with an EPA accession number and we have in turn asked EAB to reexamine this study. EAB is having this study, as well as all of the other studies, reviewed by their contractor. EAB's consolidated review is expected to be completed by 3/18. If the study shows the uptake as reported by California, it is likely we will not withdraw the plant rotational crop restriction.

Currently, there is a petition pending for the establishment of tolerances on beets (tops/roots/and by-products.) Shell must complete a two year dog feeding study before OPP will consider the petition further. Therefore, a tolerance on beets is at best a year or two away. The petitioner is requesting a 10 ppm tol. for tops and a .05 ppm tol. for the root. There is also a food additive tolerance pending that may cause difficulty because of bound residues in chicken liver that has made the ADI unacceptable in previous crops. In fact, an alfalfa petition for a tolerance was previously withdrawn because of this problem. It is still too early to know what will happen to the beet petition in this regard.

Herb Harrison has informed William Prendergast in our Congressional Liaison Office of the status of this application.

Douglas Campt



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

Common Name: **FENVALERATE** Date. 09/27/89
Chem. Name : CYANO-[3-PHENOXYPHENYL)METHYL-4-CHLORO- -(1-METHYLETHYL)
: BENZENEACETATE
Shaugh. # : 109301 CAS Number: 51630-58 1
Type Pest. : Insecticide
Formulation. EC, DUST, GRANULES, WP
Uses : CONTROL OF MANY INSECTS IS FIELD CROPS SUCH AS PEANUTS,
: COTTON, POTATOES, SOYBEANS
:

Empir. Form: $C_{25}H_{22}NO_3Cl$ VP (Torr) 1.1E-8
Mol. Weight: 419.89 Log Kow :
Solub.(ppm). 1 @ 20 C Henry's :

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

Photolysis (161-2, 3, 4)
Air :[ ]
Soil :[*] >28 DAYS IN SUN OR ARTIF.
Water:[#] 41 DAYS
:[ ]
:[ ]
:[ ]

MOBILITY STUDIES (163-1)

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

Rf Factors
1.[*] 0.00 IN SdLm, SiClLm, SAND,
2.[ ] AND SiLm SOILS.
3.[*] AGED RESIDUES WERE IMMOBILE
4.[ ] IN A COLUMN OF SdLm SOIL.
5.[ ]
6.[ ]

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

Aerobic Soil (162-1)
1.[*] 65 DAYS IN SdLM
2.[*] 96 DAYS IN SiLm (IN ANOTHER
3.[ ] SiLm, 8 MONTHS)
4.[*] 25 DAYS IN SdLm IN ARKANSAS
5.[*] 34 DAYSIN ClLm IN OKLAHOMA
6.[*] 54 DAYS IN SdLm IN ALABAMA
7.[ ]

Anaerobic Soil (162-2)
1.[*] RATES SIMILAR TO AEROBIC
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. **FENVALERATE** Date: 09/27/89

VOLATILITY STUDIES (163-2,3)

[#] Laboratory. DID NOT VOLATILIZE FROM WATER DURING 5 HOUR STUDY.
[ ] Field:

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

Terrestrial Field (164-1)
1.[*] DISSIPATION WAS ESSENTIALLY ALL IN THE 0-4" LAYER WITH A
2.[ ] HALF-LIFE OF 1-2 MONTHS. AFTER 183 DAYS, RESIDUES WERE
3.[ ] AT NEGLIGIBLE OR UNDETECTABLE LEVELS.
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.[*] PARENT AND METABOLITES ARE NEAR OR BELOW DETECTION
2.[ ] LIMITS WHEN PLANTED 30- AND 120-DAYS AFTER APPL.

Field Rotational Crops (165-2)
1.[*] FENVALERATE NOT DETECTED IN BEET ROOT AND TOP SAM-
2.[ ] PLES PLANTED IMMEDIATELY AFTER 10 APPL.@ .2 LB AIA

Irrigated Crops (165-3)
1.[ ]
2.[ ]

Fish (165-4)
1.[#] RAINBOW TROUT BCF. EDIBLE 407 X (PARENT COMPD ACCOUNTED FOR
2.[ ] 90% OF THE RESIDUES. DEPURATION SLOW (50% LEFT AFTER 33DAYS

Non Target Organisms (165-5)
1.[#] HIGHLY TOXIC TO BEES
2.[ ]

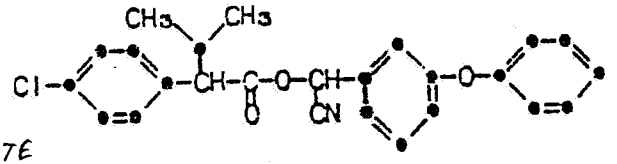
3

Appendix VII. STRUCTURES AND NAMES OF THE SD AND WL COMPOUNDS

SD 43775

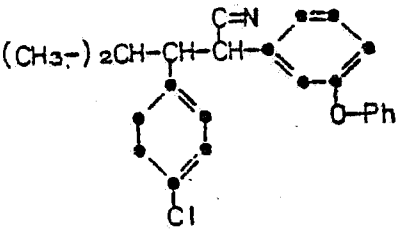
Benzeneacetic acid, 4-chloro-alpna-(1--methylethyl)-, cyano(3-phenoxyphenyl)methyl ester.

FENVALERATE



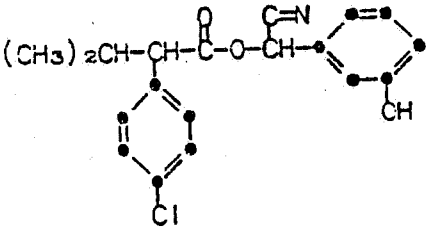
SD 54597

Benzenepropanenitrile, 4-chloro-beta--(1-methylethyl)-alpha-(3--phenoxyphenyl)-.



SD 58086

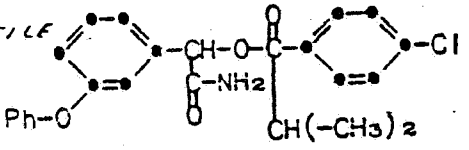
Benzeneacetic acid, 4-chloro-alpha-(1--methylethyl)-, cyano(3-hydroxyphenylmethyl ester.



WL 47117

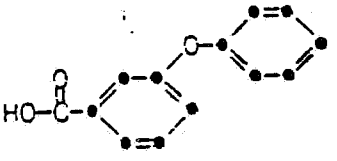
MAJOR NON-VOLATILE DEGRADATE →

Benzeneacetic acid, 4-chloro-α-(1-metnylethyl)-, (aminocarbonyl)(3-phenoxypnenyl)methyl ester.



WL 44607

Benzoic acid, 3-phenoxy-.



4

Common Name. **FENVALERATE** Date: 09/27/89

GROUND WATER STUDIES (158.75)

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

DEGRADATION PRODUCTS

1. 4-CHLORO- -1-METHYLETHYL BENZENE ACETIC ACID (PHOTODEGRADATE)
2. COMPD 47117 = MAJOR NON-VOLATILE DEGRADATE
3. MAJOR DEGRADATE IN SOIL METABOLISM IS CO2.
4.
5.
6. THE THREE MAJOR DEGRADATES DO NOT PERSIST IN 4 DIFFERENT SOIL
7. TYPES DESPITE 10 TO 15 CONSECUTIVE MULTIPLE APPLICATIONS.
8.
9.
10.

COMMENTS

FENVALERATE WAS STABLE AT pH'S 5,7,9 FOR 93.5 HOURS AT 38 C.
FENVALERATE ADSORBED STRONGLY TO GLASS, TEFLON, AND POLYPROPYLENE

SOIL Koc = 50d

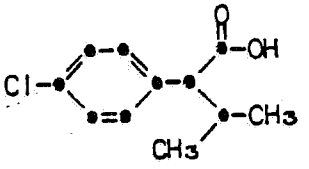
References: EAB FILES
Writer : J. HANNAN

Appendix VII. STRUCTURES AND NAMES OF THE SD AND WL COMPOUNDS (Cont'd)

SD 10944

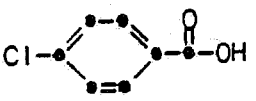
PHOTO-DEGRADATE

Benzeneacetic acid, 4-chloro-α-(1-methylethyl)-.



SD 993

p-Chlorobenzoic acid.



(Dave
ok'd Tues. PM.
as soon as

March 17, 1986

John / Ernest —

Here is the status of the fenvalerate rotational crop issue as I see it:

1) We are to receive both task I and task II back from Dynamac by Tuesday or Wednesday. As soon as they arrive, I would like to sit down with you and review the conclusions. I specifically need to focus on the distinctions between the California and New Jersey studies and between the hot and cold study results.

2) I would like to reach a conclusion right away. I have promised California that we would verbally tell them our decision ASAP. Their main concern (voiced to me on Friday) was that they had some studies that we did not have.

(7)

Dave Sauer

01/01/84

EXPOSURE ASSESSMENT BRANCH
PESTICIDE ENVIRONMENTAL FATE ONE-LINER

FENVALERATE

File No.: 109301 CAS No.: 51630-58-1
Type Pesticide INSECTICIDE
Chemical Name: CYANO-[3-PENOXYPHENYL)METHYL-4-CHLORO-
-a-(1-METHYLETHYL) BENZENEACETATE
Empirical Form.: C24H21NO2C1
Uses:
Form. Type:

Mole Wt.	Sol. @20C (ppm)	Vap.Pres.(torr)	Log Kow	Henry
419.9	20.00	1.1E-8	0.00	

Hydrolysis (161-1)
pH 5: >93 HR **
pH 7: >93 HR **
pH 9: >93 HR **

Photolysis (161-2, -3, -4)
Air:
Soil:<21 DA #
Water:28 DA W/ 2%ACETONE **

Mobility Studies (163-1)
Soil Partition (Kd)
1
2
3
4
5

Rf Factors

Soil Metabolism Studies - Terrestrial
Aerobic (162-1)
1 65-240 DA (SOIL?)
2
3
4
5
6
7

Anaerobic (162-2)
180 DA

Soil Metabolism Studies - Aquatic
Aerobic (162-4)
1
2
3
4

Anaerobic (162-3)

Field Dissipation Studies
Terrestrial (164-1)
1 1-2 MO; ALL IN 0-4" **
2
3
4
5
6

Aquatic 164-2)

** EPA Acceptable Study
# Supplemental (Scientifically Sound) Information

8

FENVALERATE

Field Dissipation Studies
Forest (164-3) Other (164-5)
1
2

Ground Water Findings
1
2
3

Rotational Crop Restrictions (165-1, -2)
1 12 MO ROOT CROPS, 9 MO OTHERS
2

Fish Accumulation Studies (165-4)
1 TROUT EDIBLE 400X; 40-60% RESIDUES RETAINED
2 CATFISH EDIBLE 62X; 46 DA DEPURATION T1/2

Degradation Products
1
2
3
4
5

Notes
FENVALERATE (PYDRIN)

Pydrin is considered immobile in soils especially loams. Pydrin is stable to hydrolysis.

Major degradation products are benzeneactetic acid, 4-chloro-a-(1-methyl-ethyl), (amino-carbonyl)-(3-phenoxyphenyl)methyl ester and benzoic acid. Further mineralization to CO2 occurs.

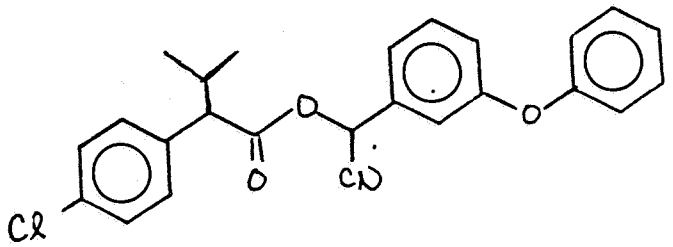
Field monitoring study indicated that compound is strongly sorbed to soil surface and subject to runoff from treated areas with soil particles.

References
EAB FILES
Writer

1.0 INTRODUCTION

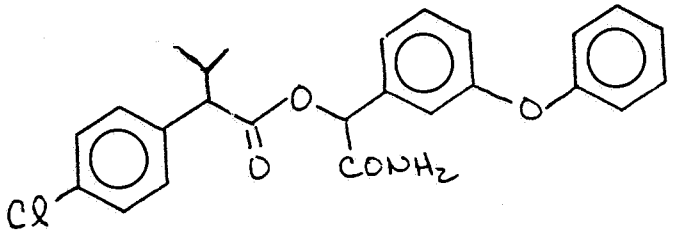
Shell Oil has submitted an application to delete the crop rotation restriction currently found on its label for Pydrin, 2.4 EC, an insecticide. Acc No 248812.

2.1 Pydrin: SD 43775



benzeneacetic acid, 4-chloro-alpha-(1methylethyl)-cyano(3-phenoxyphenyl)methyl ester

2.2 SD 47117



benzeneacetic acid, 4-chloro-alpha-(1-methylethyl)-(aminocarbonyl)(3-phenoxy-phenyl)methyl ester

3.0 DISCUSSION

A confined rotational crop study as well as field rotation crop studies are reported. In the confined study, lettuce, table beets, and wheat were planted 30 and 120 days and 1 year after soil treatment. The results of the 1 year study were not reported. In the field studies, radishes, collards, and wheat were planted where cotton had previously been grown. These rotation crops were planted 400 days after the last of 38 applications of pydrin at 0.2 lb ai/acre to cotton and 30 and 120 days after 48 applications to cotton at the same rate. Soil samples in all studies were collected and analyzed.

3.1 A 30- and 120-Day Rotation Crop Study Using ^{14}C-SD 43775 Following a Single Soil Treatment at a Dosage Rate of 2 lb ai/ Acre. P.W. Lee, S.M. Stearns, and W.R. Powell, Tab 13.

Radiolabeled pydrin, both chlorophenyl- and phenoxyphenyl-labeled materials, were used. A total of 45 soil containers were prepared for the experiment. Hanford sandy loam soil (57.6% sand, 26.6% silt, 15.8% clay, 0.7% organic carbon, 9.3 meq/100 grams cation exchange capacity, and 6.1 soil pH) was packed into the containers. Each soil container was treated at a dosage rate of 2 lb ai/acre SD 43775. The application of 1/8 inch of water followed pesticide application. Cultivation of the soil took place 3-4 days after application. The soil was left to age under outdoor conditions for the appropriate number of days intervals before planting.

Soil core samples were collected at 3-4 days after application, 30-, 120-day and 1 year post application and at harvest of mature plant. Lettuce, beets, and wheat were grown at 30 and 120 days after application.

Soil samples were extracted with methanol and were quantified by LSC. The aqueous solution mixtures were extracted with chloroform and analyzed by two-dimensional TLC and LSC. Beets and straw samples were extracted using a hexane/isopropanol solvent mixture. Coextractions from concentrated hexane solvent extract were removed using 5% ethyl acetate in hexane. SD 43775 residues were determined by GLC. Reference standards for SD 43775 and possible metabolites are given in Table 3.

Results

The normal background level, limit of detection (Lm) and combustion efficiency are given in Table 4. Tables 6 and 7 present residue data in soil at the various sampling times. Table 8 gives the percent applied radioactivity in methanol extractable and non-extractable portions. All metabolites were less than 10% of original radioactivity.

The half life of applied ^{14}C-pydrin in sandy loam soil was calculated to be 60 days (Figure 3).

Table 5 summarizes the residues in various mature plant samples and in soil samples at planting time. The ^{14}C-residue levels in lettuce at all planting levels ranged from 0.01 - 0.03 ppm. For beet leaves the residues ranged from 0.10 - 0.18 ppm for the 30 day sample but 0.02 ppm for the 120 day sample. In beet roots for the 30 day sample 0.27 - 0.31 ppm were found and residues ranging from 0.03 - 0.04 ppm were found at 120 days. Wheat straw showed levels ranging from 0.29 - 0.33 ppm at 30 days but from 0.04 - 0.05 ppm at 120 days. Wheat hulls and grain highest residue levels were at 30 days (0.08 ppm and 0.04 ppm, respectively). At 120 days, wheat hulls and grain showed levels below limit of detection. Further analysis of beet roots and wheat straw indicated no detectable SD 43775.

Conclusions

It appears that the confined rotational crop study indicates that residues of pydrin and its metabolites are at levels near or below limits of detection at 30 and 120 day planting intervals after an original single application of pydrin at a rate equivalent to 2 lb ai/acre.

11

FENVALERATE Sh # 109301

Page_____ is not included in this copy.

Pages 12 through 33 are not included.

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 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.

X 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.