DATE: 1/16/79

To: Product Manager - Mitchell (17)
TS-767

Through: Dr. Gunter Zweig, Chief
Environmental Fate Branch

Through:

From: Review Section No. 2
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 201-UNR

Chemical: Cyano(3-phenoxyphenyl)methyl-4-chloro-alpha-(1-Methylethyl)benzeneacetate

Type Product: Insecticide

Product Name: Pydrin Insecticide 2.4EC

Company Name: Shell Chemical Company

Submission Purpose: Cotton use - reply to EPA letter of July 26, 1978.

Date In: September 1, 1978

Date Out: 1/16/79

40 day review
New data
revised data
addendum

1.0 Introduction

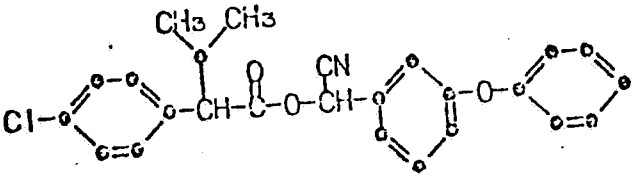
Active ingredient . cyano(3-phenoxyphenyl)methyl 4-chloro-alpha-(1-methyl-ethyl) benzeneacetate

Trade name: PYDRIN INSECTICIDE
The following are also used to indicate the active ingredient: SD43775,WL43775 fenvolerate, Sumicidin, and S5602.

This review is for the applications for registration of two products. (1) Technical PYDRIN INSECTICIDE and (2) PYDRIN INSECTICIDE 2.4 Emulsible Concentrate. The formulated product is proposed for use on cotton.

Physical and Chemical Properties

CHEMICAL STRUCTURE:



EMPIRICAL FORMULA: $C_{25}H_{22}ClNO_3$

Molecular Weight	419.9
Physical Form at 23°C	clear viscous liquid
Color	yellow
Odor	mild chemical odor
Density at 23°C	1.17 g/ml
Vapor Pressure at 25°C	1.1 X 10 mmHg

Solubility:

Solvent	g/l at C	
	0°C	20°C
Hexane	49	77
Xylene	>450	>450
Acteone	>450	>450
Chloroform	>450	>450
Methanol	253	>450
Hexylene Glycol	>450	>450
Water	---	< 20 ppb

2

The current submission consists of data contained in Accession No. 097296 entitled volume III-Environmental Chemistry in Support of 201-UNR.Also included is a letter from the registrant dated August 22, 1978 which contains responses to comments in EPA letter of July 26, 1978. Substantive comments are also to be found in an earlier review of 7/11/78 which was the joint effort of Ron Ney, Art Schlosser, Karen Sampson, Charlotte Blalock and Willa Garner.

2.0 Directions for Use: See attached labels

3.0 Discussion of Data

I. Hydrolysis:

Registrant claims that Pydrin is soluble in water to only about 2 ppb and therefore it is not possible to conduct a satisfactory hydrolysis study. No new data were submitted. Data submitted earlier indicate the water solubility of Pydrin at 20°C to be <20 ppb. Also, it appears that method MMS-R-478-1 of April, 1978 (Tab 21) is capable of detection of SD-43775 to 0.0001 ppm by GLC. In addition, in TIR-22-102-78 Tab 13 of Accession No. 09700 analyses for SD-43775 in water are reported at the 0.05 ppb level. Analytical methodology described in Tab No. 1 of Accession No. 097296 suggest that the identification and estimation of hydrolysis products of SD-43775 might be possible.

Conclusions:

(1) An adequate hydrolysis study of SD-43775 may be possible to conduct since the solubility level of SD-43775 in water does not appear to be firmly established and adequate methodology for identification and estimation of SD-43775 and its hydrolysis products appears to be available eg. MMS-R-478-1 (Tab 21), TIR-22-102-78 (Tab 13 of Accession No. 09700) and methods described in Tab 1 of the present submission Accession No. 097296.

Also, a study involving an organic co-solvent at the lowest percent level which will allow true solution is feasible. Such a study (at 38°C and pH 1.1, 7.2 and 9.1) was reviewed by C. Blaylok (See 7/11/78 review, page 3)

II. Photodegradation

A. Soil

Photochemical degradation of chlorophenyl-labeled 14C-SD43775 on soil. H. Y. Fan. Report No. TIR-22-101-76, Addendum #2, Tab. No. 1.

Chlorophenyl-ring labeled SD-43775 on the surface of a Hanford sandy loam soil was exposed to sunlight for 21 days. The major non-volatile product appeared to be the amide SD-47117 which accounted for 13% of applied radioactivity in exposed sample and 7.7% in dark control. Minor photoproducts comprising less than 1% of applied activity were SD52666 or SD53919 and SD53065. The presence of comparable amounts of the amide, SD-47118, on the dark control and exposed plates makes it questionable whether this compound is produced by direct photochemical conversion.

Photochemical degradation of SD-43775 on glass and soil. H. Y. Fan Report No. TIR-2-109-78 Tab #26.

Phenoxyphenyl labeled SD-43775 on glass and on Hanford sandy loam soil was exposed to natural sunlight. For the sample on glass, about 68% of applied activity was lost in 21 days compared to 2.5% for the dark control. About 20% of applied activity was found at one R_f zone for the exposed sample but the material was not chemically identified. No other major products were found. For the dark control about 20% was SD-47117, 12% SD-42049 (3-phenoxybenzaldehyde) and at least 60% parent compound at 14 days. For the sample exposed on soil about 68% of total applied activity was recovered at 28 days compound to 87% for the dark control. For the exposed sample at 28 days, about 15% of applied activity was identified as SD-47117 and about 26% as parent compound. The dark control on soil gave 32% SD-47117 and 36% parent compound at the same time interval. No other compounds comprised more than a few percent applied activity.

B. Aqueous

No studies on water were submitted. However, see conclusions below.

C. Conclusions

(1) Pydrin does not photodegrade readily to significant amounts of non-volatile products on the surface of soil.

(2) The amide, SD-47114, was identified as the major product for both exposed samples and 'dark' controls.

(3) The data requirement for photodegradation on soil surfaces is satisfied.

(4) Registrant claims that a study of photodegradation in water is not possible because of the low solubility of the chemical. However, a study was submitted previously using a 2% aqueous acetone solution. This study (reviewed by W. Garner, p. 8 of 5/11/78 review) showed substantial loss on exposure to sunlight for 28 days (72% loss) and formation of 2 major unidentified photoproducts only identified as R_f zones on thin layer chromatograms.

III. Metabolism (Aerobic-Anaerobic-Sterile)-Laboratory Studies

(1) Degradation of 14C-(chlorophenyl)-SD-43775 during exposure to soil under aerobic, anaerobic, and sterile conditions. J. E. Loeffler Report No. TIR-22-108-76 Tab No. 2 This report has been previously reviewed 5/11/78.

(2) Physical properties of Hanford sandy loam soil Tab No. 3 This information has been submitted previously (See review 6/23/78)

(3) Degradation of 14C-(chlorophenyl)-SD-43775 during exposure to soil under aerobic, anaerobic and sterile conditions. A. C. Page and E. W. Rutherford TIR-22-108-76, Addendum #1 Tab No. 4
This report was previously reviewed 6/23/78.

(4) One-year study, of the fate of phenoxy-phenyl-ring-labeled 14C-SD-43775 in soil. H. Y. Fan.
TIR-22-112-78 Tab No. 5, Accession No. 097296
Phenoxy-phenyl ring labeled SD-43775 was added to a Hanford sandy loam soil at 0.15 lbs/acre four times at four-week interals.

The physical properties of this Hanford sandy loam were obtained from two sources:[a,b)]

	Sources	
	Nelson Lab.[b)]	USDA[a)]
Organic Content, % (Walkley and Black)	0.7	0.5[c)]
Soil pH (in 0.01 M $CaCl_2$ suspension) (Method of Soil Analysis, Amer. Agron., p. 923)	6.1	5.9
Cation Exchange Capacity (Barium Acetate, U.C. Extension Procedure)	9.3 meq/100 g	---
Sand, % (Hydrometer (soil colloid)--	57.6	67.1
Silt, % U.C. Extension Procedure)	26.6	21.9
Clay, %	15.8	11.0
Water Holding Capacity, % (1/3 bar)	---	10.7

Predominant clay minerals in Hanford sandy loam are 50% kaolinite, 10% biotite mica, and 4% montomorillonite.

Soil samples were taken before the addition of the second, third and fourth dosage of SD-43775. Soil samples were analyzed by total combustion for total 14C content and were also analyzed by TLC after Soxhlet extraction with methanol for 48 hours.

Data indicate very little movement of radioactivity below the 0-3" level over the 11 month period of the study. The percentage of total activity remaining that is extractable with methanol is shown to decrease with time from about 80% at 4 weeks to 40% at 11 months.

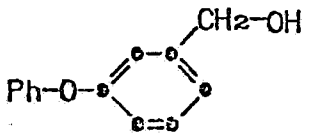
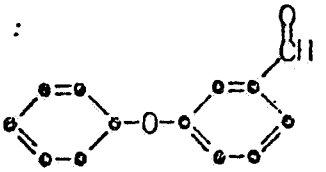
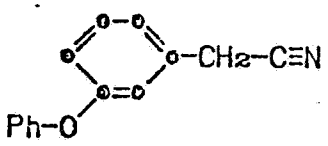
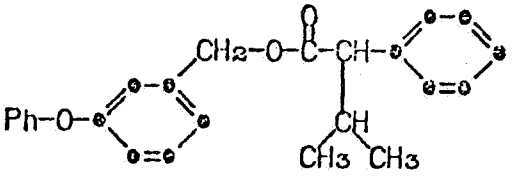
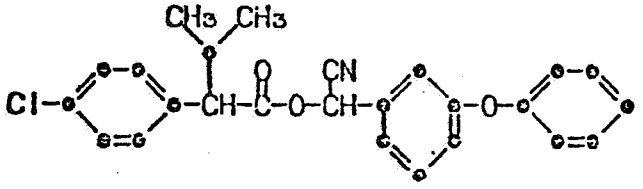
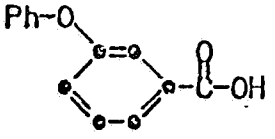
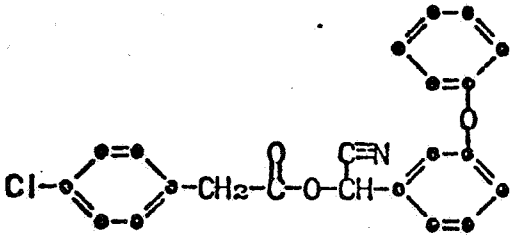
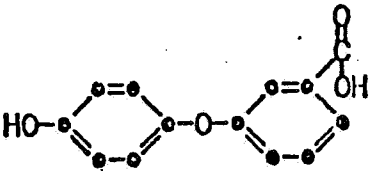
The half-life of extractable parent compound SD-43775 appears to be about 4 weeks. This is in general agreement with work previously done with chlorophenyl-ring labeled material. (Review of 5/11/78)

The major metabolite found is the amide (SD-47117). 3-phenoxy-benzoldehyle and at least six other products are identified by TLC. Recovery data are given below.

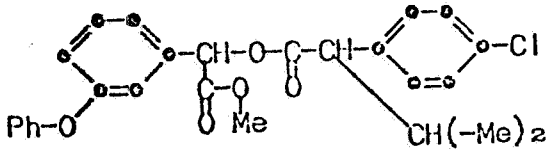
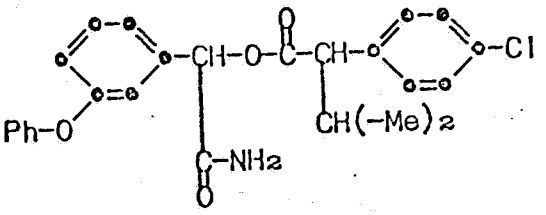
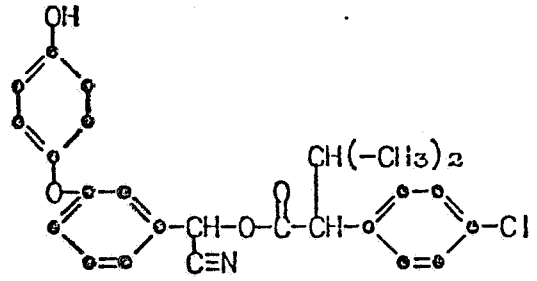
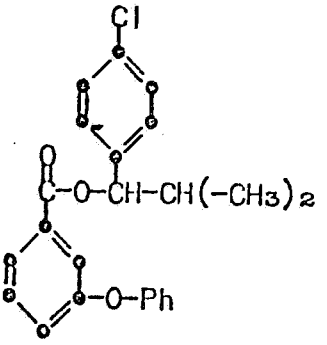
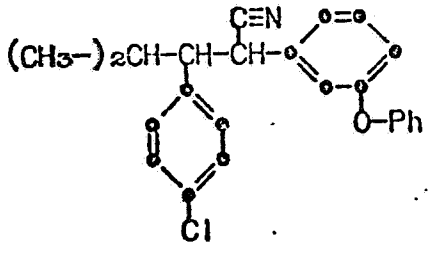
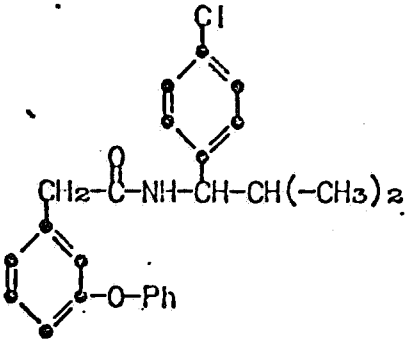
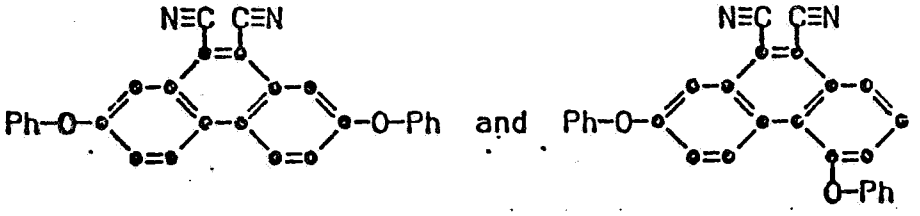
THE RECOVERY OF ^{14}C IN THE VARIOUS R_f ZONES OF THE CHROMATOGRAMS OBTAINED FROM METHANOL EXTRACTS OF SOILS AT THE 0-3-INCH LEVELS AND VARIOUS TIME INTERVALS EXPRESSED IN PERCENT OF ORIGINALLY-APPLIED RADIOACTIVITY

Chromatogram zones	Standards	Time Intervals			
		4 Weeks	8 Weeks	5 Months	11 Months
1	--	3.9	3.3	1.7	1.1
2	SD 46114	2.2	1.9	1.4	0.5
3	SD 47117	16.5	11.2	4.4	1.8
4	SD 40673	1.4	1.2	0.5	0.4
5	SD 44607	1.8	1.2	1.2	0.2
6	SD 45329	1.4	0.5	0.2	0.2
7	SD 42049	6.0	3.0	1.3	1.0
8	SD 43775	48.0	36.7	14.4	7.1
9	SD 43774	0.5	0.6	0.3	0.1

POSSIBLE METABOLITES OF SD-43775

SD #	Structure	SD #	Structure
40673		42049	
42453		43774	
43775		44607	
45329		46114	

POSSIBLE METABOLITES OF SD-43775

SD #	Structure	SD #	Structure
47116		47117	
48838		53036	
54597		55886	
56637			

9

(5) One-year study of the fate of 14C-SD-43775 in soil. H. Y. Fan. TIR-22-107-77 Tab No. 6. This report was previously reviewed 5/11/78.

(6) One-year study of the fate of 14C-5D-43775 in soil H. Y. Fan. TIR-22-107-77 (Addendum) Tab No. 7 This report was previously reviewed 5/11/78.

(7) One-year study of the fate of 14C-SD-43775 in soil H. Y. Fan. TIR-22-107-77 Addendum #2 Tab No. 8 This report was previously reviewed 5/11/78.

(8) One-year study of the fate of 14C-SD-43775 in soil. H. Y. Fan TIR-22-107-77. (Addendum #3) Tab No. 9 This report was previously reviewed 6/23/78.

Conclusions on Laboratory Studies:

(1) SD-43775 degrades in soil under aerobic conditions with a half-life of about four weeks. The amide (SD-47117) is the only major metabolite. At least six other products are formed at no more than a few per cent of applied material for each compound.

(2) Under anaerobic conditions degradation proceeds at a slower rate (Tabs 5 and 6 of Accession No. 096386) with a half-life probably about 6 months. It does not appear that any metabolite consisting of over 10 % of starting material is formed at 60 days from establishment of anaerobicity.

(3) The data requirement for soil metabolism is satisfied.

IV. Effect of Pydrin on soil microorganisms.

Impact of commercial Shell products on microorganisms in the soil-effect on nodulation on pinto beans and on the nitrogen fixation bacteria. W. E. Rader and J. W. Love. TIR-22-112-77 Tab #10 This report was previously reviewed 5/11/78.

Impact of commercial Shell pesticides on microorganisms in the soil. Part III. Effect of compounds on the populations of microorganisms and the O_2/CO_2 exchange in treated soil. W. E. Rader, J. W. Love, and E. Y. Cahi TIR-22-112-77, Part III Tab No. 11.

SD-43775 was one of about 14 pesticides studied. Its effects on bacteria, fungi and actinomycates at 1X (0.2 lb/A) and 4X dosage rates in a Hanford sandy loam were determined by population count. None of the microorganisms was

specifically identified. Exposure time was 21 days. SD-43775 was found not to have any residual effect on the three types of microorganisms under the conditions of the study. Some depression of fungi populations was noted but recovery occurred.

Utilization of O_2 was found to be generally related to microbial population and therefore was not affected by SD-43775. However, in vitro studies on one species of bacteria, Pseudomonas denitrificans, showed some inhibition of oxygen consumption in 24 hours.

Conclusions:

(1) Under conditions of the study, SD 43775 did not appear to have a significant residual effect on gross populations of bacteria, fungi or actinomgates or oxygen utilization.

(2) Representative microorganisms were not identified (to genus).

(3) Data on effects on soil algae such ass Nostoc and on anaerobic N_2 fixers such as Clostridium are needed.

(4) Data requirements are not satisfied.

V. Leaching:

Soil characteristics Sandy loam - WKGR130.76 Tab No. 12

Data are given on the soil used in the leaching study described in Tab 9 of Accession No. 096386. This study was reviewed 5/11/78.

Clay 32.7%, Silt 15.6%, Sand 51.6%, Organic matter 2.21%, pH 7.3, Cation exchange capacity 8.9 meg/100g air dried soil

Conclusions:

(1) SD-43775 did not leach in the soils tested and its degradation products do not leeach significantly. Small amounts of 2-(4-chlorophenyl)isovaleric acid were identified in leachate in one study.

(2) The data requirement is satisfied.

VI. Field dissipation:

1975 - Residue data for SD-43775 in soil from a cotton plot treated with eight applications of SD-43775. A Texas study. TIR-24-259-75 Tab No. 15.

SD-43775 in 2.4 EC formulation was applied to cotton at 0.2 and 0.4 lbs. a.i./acre for 8 applications from 6/14 to 7/29/75. Azodrin and Guthion, were also applied. Soil was sampled 65 days after final treatment. Test site: Donna, Texas. Soil: Sandy loam, per-cent organic matter not available. The analytical method used was MMS-R-425-1 (parent compound only is determined).

Residues in soil for both dosage rates are reported as 0.01 ppm in the 0-3" soil depth and <0.01 at 3-6" and 6-12".

It is noted that the minimum detectable residue of SD-43775 by method MMS-R-425-1 is reported as 0.10 ppm and soil recovery studies have only been made to 0.5 ppm with recovery at this level not specifically reported. (See Tab 19)

Conclusions:

(1) The reporting of soil residues at the 0.01 ppm level is questionable based on data given in Tab 19 on the analytical method ussed. (MMS-R-425-1)

(2) Analyses were only made for parent compound.

(3) Only one soil sample was taken.

1976-1977. Residue data for SD-43775 in soil resulting from a total of twenty applications to cotton plants. A California study. TIR-24-141-75-B Tab No. 16

SD-43775 was applied to cotton at 0.2 lb. a.i./acre per application for eight applications in 1976 and 11 applications the previous year (1975) in Modesto, California. Formulation 2.4 EC. Soil type: Hanford sandy loam containing 0.5-1.0% organic matter. Soil samples were analyzed by method MMS-R-478-1. This method is described in Tab 21. Although the data claim nine applications in 1976 dates are given for only eight applications. Some of the data are given below.

Soil Sample	SD-43775 Dosage, lb. a.i. per acre per Application[a)]	Interval, Final Treatment to Sampling, Days	SD-43775 Residue Found, ppm
0 - 3"	0.2	18	0.15
3 - 6"	0.2	18	0.01
6 - 12"	0.2	18	<0.01
0 - 3"	0.2	216	0.02
3 - 6"	0.2	216	0.08
6 - 12	0.2	216	0.12
0 - 3"	0.2	300	0.02
3 - 6"	0.2	300	<0.01
6 - 12"	0.2	300	<0.01

Conclusions:

(1) Insufficient intervals were sampled to describe a significant decline curve.

(2) Analyses were made for parent compound only.

(3) Additional information is needed on SD-43775 recovery from soil by method MMS-R-478-1 to verify reported residue levels.

1975 - Residue data for SD-43775 in soil from a simulated rotation study at BSRC, Modesto, California. TIR-24-144-75 Tab No. 20.

SD-43775 in 2.4 EC formulation, was applied at 0.1 or 0.5 lb. a.i./acre for one application to bare Hanford Sandy Loam soil (0.5 to 1.0% organic matter) in Modesto, California. Soil samples were taken 82 and 127 days after aplication and analyzed by method MSS-R-425-1 for parent compound. Data are given below:

Source of Soil Sample	SD-43775 Dosage Lb. a.i. Per Acre Per Application[a]	Soil Depth	Interval, Final Treatment ro Sampling, Days	SD-43775 Residue Found, ppm[b]
Alfalfa Plot	None	0-3"	---	< 0.01
"	None	6-12"	---	< 0.01
"	0.1	0-3"	82	< 0.01
"	0.1	3-6"	82	< 0.01
"	0.1	6-12"	82	< 0.01
"	0.5	0-3"	82	0.09
"	0.5	3-6"	82	< 0.01
"	0.5	6-12"	82	< 0.01
White Potato Plot	None	6-12"	---	< 0.01
"	0.1	0-3"	127	< 0.01
"	0.1	3-6"	127	0.01[c]
"	0.1	6-12"	127	0.03[c]
"	0.5	0-3"	127	0.04
"	0.5	3-6"	127	0.06[c]
"	0.5	6-12"	127	0.02[c]
Wheat Plot	None	6-12"	---	< 0.01
"	0.1	0-3"	127	< 0.01
"	0.1	3-6"	127	< 0.01
"	0.1	6-12"	127	< 0.01
"	0.5	0-3"	127	0.04
"	0.5	3-6"	127	< 0.01
"	0.5	6-12"	127	< 0.01
Soybean Plot	None	6-12"	---	< 0.01
"	0.1	0-3"	127	0.02
"	0.1	3-6"	127	< 0.01
Soybean Soil	0.1	6-12"	127	0.01
"	0.5	0-3"	127	0.04
"	0.5	3-6"	127	< 0.01
"	0.5	6-12"	127	< 0.01

A) The plots received one application at the indicated dosage.
B) Values represented are on a dry weight basis.
C) Soil was subjected to "hilling up" and typical potato harvesting techniques before sampling which resulted in mixing the surface soil to varying depths.

Conclusions:

(1) This study involved application to bare soil and was not carried out under actual use conditions.

(2) The reporting of soil residues at the 0.01 ppm level by method MMS-R-425-1 is questionable. See review of Tab 15 and discription of the analytical method Tab 19.

General Conclusions (Field Soil dissipation)

(1) None of the three studies submitted is acceptable at this time.

VII Rotational Crops.

1978. Residue data for SD-43775 in rotation crops (English peas and turnips) following eight applications of SD-43775 to cotton the previous year. A Mississippi Study TIR-24-199-78 Tab No. 27

SD-43775 was applied in 2-4EC formulation to cotton at 0.2 and 0.4 lbs. a.i./acre for eight applications. English peas and turnips were planted on treated area 270 days after last application. Whole plants were sampled at maturity and analyzed for parent compound only by method MMS-R-478-1. Some of the data are given below.

ANALYTICAL RESULTS

Analyses of Samples

Sample	SD-43775 lb a.i. per acre per Application	Interval (Final) Treatment to Sampling, Days	SD-43775 Residue Found, ppm
Turnip tops	None	-	<0.01
Turnip tops	0.20	270	<0.01
Turnip tops	0.40	270	<0.01
Turnip tops	None	-	<0.01
Turnip tops	0.20	270	<0.01
Turnip tops	0.40	270	<0.01
English peas	None	-	<0.01
English peas	0.20	270	<0.01
English peas	0.40	270	<0.01

Analysis of Recovery Samples

Sample	SD-43775 Fortification Level, ppm*	% Recovered by Analysis
Turnip tops	0.10	92
Turnip tops	0.05	91
English peas	0.05	79

* SD-43775 was added to portions of sample before extraction and analyses were performed to monitor the analytical method.

1978. Residue data for SD-43775 in rotation crops (English peas and turnips) following eight applications of SD-43775 the previous year to cotton. A Mississippi study. TIR-24-200-78 Tab No. 28

SD-43775 was applied to cotton in 2.4EC formulation at 0.2 lbs. a.i./acre for eight applications. English peas and turnips were planted on treated areas 270 days after last application. Whole plants were sampled at maturity and analyzed for parent compound only by method MMS-R-478-1. Some of the data are tabulated below.

Analyses of Samples

Sample	SD-43775 Dosage, lb a.i. per Acre per Application[a)]	Interval, Final Treatment to Sampling	SD-43775 Residue Found, ppm
English peas	None		<0.01
English peas	0.20	270 days	<0.01
Turnip tops	None		<0.01
Turnip tops	0.20	270 days	<0.01
Turnip roots	None		<0.01
Turnip roots	0.20	270 days	<0.01

Analysis of Recovery Samples

Sample	SD-43775 Fortification Level, ppm*	% Recovered by Analysis
English peas	0.05	81
Turnip tops	0.05	70
Turnip roots	0.05	78

* SD 43775 was added to portions of sample before extraction and analyses were performed to monitor the analytical method.

Conclusions:

(1) Data on Pydrin residues per-se appear to support, a rotational crop restriction of 12 months for root crops and 9 months for all others. However, based on ^{14}C uptake studies (See Ney's review on page 53 of 5/11/78 Review of 20-UNE and 201 UNR) substantial residues containing the p-chlorophenyl moiety may be taken up in rotated crops planted 120 days after the last treatment. The nature of these residues was not determined except that a small fraction (ca. 10%) appears to be undegraded Pydrin.

VIII. Analytical Methods

Determination of SD-43775 Residues in crops, animal tissues, soil and water. Election-Capture Gas Chromatographic Method. Tab No. 21.

A GLC method using EC detection for the analysis of SD-43775 is described. This is method MMS-R-478-1 April 1978. Initial extraction of water is with hexane, soil samples are extracted by high frequency vibration in the presence of acetone/hexane (1:1) and crops and animal tissues are extracted with hexane/isopropanol (3:1). A Florisil clean-up step is used in each procedure. Some of the reported recovery data are given below for parent compound.

	Fortification range ppm	No. of Observations	% Recovery Mean	% Recovery Std Dev
Crops	0.02 - 40.	70	94.5	13.3
Soil	0.01 - 10	60	92.6	15.7
Water	0.0001 - 0.1	15	97.6	12.8
Animal tissue	0.05 - 2	28	89.3	12.4

Conclusions:

(1) Method determines parent compound. Two separate GLC peaks were formed by the column used.

(2) Specific recovery data, especially at the lower range of fortification are needed.

Residue studies on Rotation crops grown in 14C-SD43775. Treated soils H. Y. Fan TIR-22-113-77 Tab No. 17 This report was previously reviewed 5/11/78.

Residue studies on rotation crops grown in 14C-SD-43775-treated soils. H. Y. Fan TIR-22-113-77, Addendum #1 Tab No. 18. A typical electron impact mass spectrum of SD-43775 is reproduced and submitted as an addendum to TIR-22-113-77. Ions monitored for selective ion detection are at m/e 419 and 225.

Determination of individual or combined residues of the cyano pyrethroids on soil, MMS-R-425-1 April 1975 Tab No. 19 This report was previously reviewed 6/23/78.

Memorandum of Visit. July 11, 1978 Tab No. 22

No data are given. A visit by Dr. John Onley of EPA to Shell Development Company in Modesto, California is noted. The visit concerned evaluation of analytical methods MMS-R-478-1 and MMS-R-447-3.

Determination of SD-43775 residues in crops Electron-Capture Gas Chromatographic Method MMS-R-456-1 October, 1976 Tab No. 14 This method was previously reviewed 5/11/78.

Comparison of Pydrin insecticide trace analysis methods: Electron-gas chromatographic method and GC/MS method using selected ion detection at 181AMU. E. J. Silveira and G. F. Barber TIR-25-101-78 Tab No. 24

Chromatograms, standard curves and a mass spectrum of Pydrin are given along with some comparative data.

	Solution 1	Solution 2
Known Concentration	2.0 ug/ml	4.0 ug/ml
Conc. found by GC/MS-SID	1.8 ug/ml	3.9 ug/ml
Conc. found by EC-GC	1.8 ug/ml	3.8 ug/ml

Data indicate minimum detectable concentration for 3.0% FS of 0.183 ppm for GC/MS-SID at 181 AMU and 0.002 ppm for 6.0% FS for the EC/GC method.

Conclusion:

From the data presented, the EC/GC method is much more sensitive than GC/MS. There does not appear to be any advantage in using the GC/MS method for the hydrolytic stability data.

Typical chromatograms, determination of the hydrolytic stability of WL 43775 by GC/MS-SID at 181 AMU, PH 9.1 samples. Tab No. 25

9. Ancillary Data

Characteristics of soil from the Steidinger farm, Donna, Texas. Tab. No. 13 This information was previously submitted and reviewed 6/23/78.

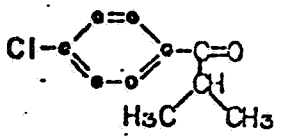
Pydrin related compounds reported in environmental chemistry studies. Tab No. 23

Structures and company code numbers are given for Pydrin-related compounds that may be found in various reports.

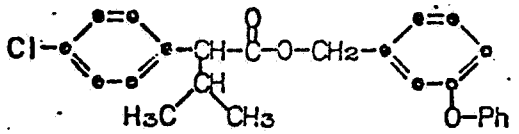
PYDRIN-RELATED COMPOUNDS REPORTED IN
ENVIRONMENTAL CHEMISTRY STUDIES

IN SOIL

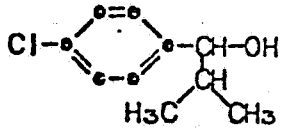
SD 39009



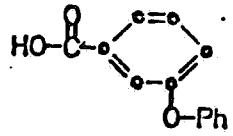
SD 43774



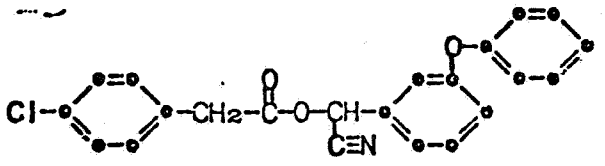
SD 44546



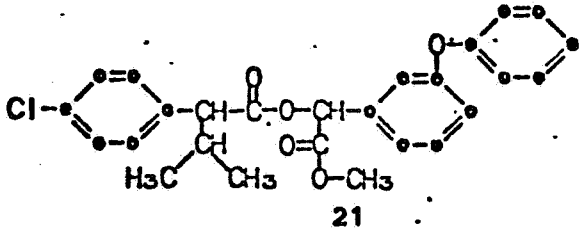
SD 44607



SD 45329

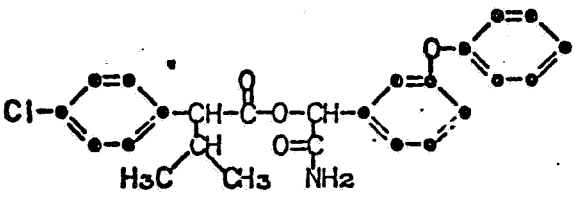


SD 47116

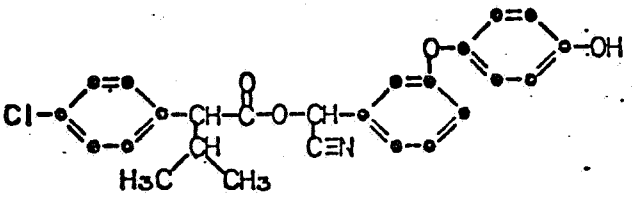


4

SD 47117



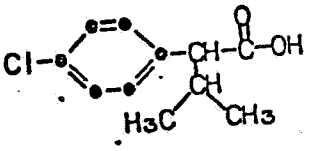
SD 48838



SD 52666

Diastereoisomers

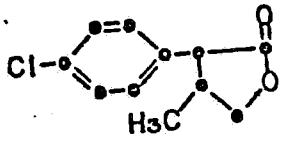
SD 53919



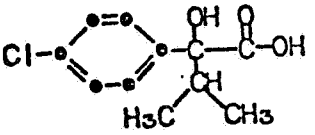
SD 52667

Diastereoisomers

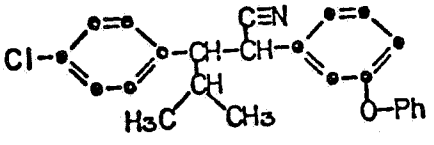
SD 53405



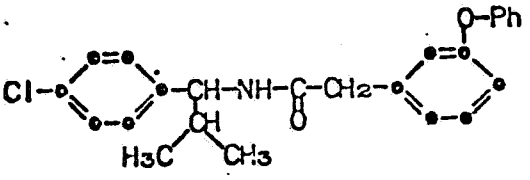
SD 53065



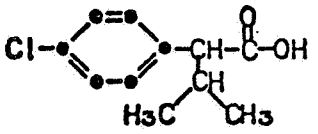
SD 54597



SD 55886

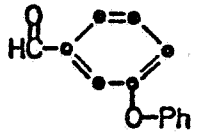


WL 10944

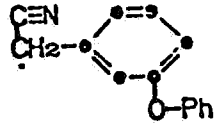


IN SOLUTION PHOTOCHEMISTRY

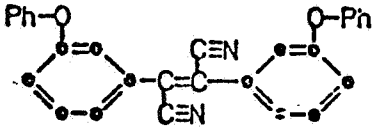
SD 42049



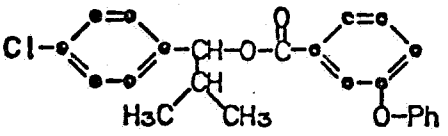
SD 42453



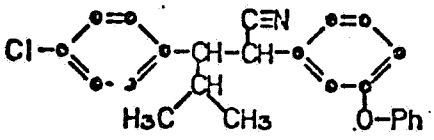
SD 44542



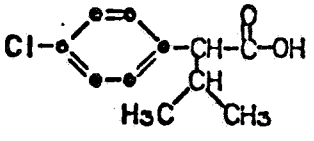
SD 53036



SD 54597



WL 10944



23

Recommendations

1. A hydrolysis study at 25°C and pH values of 5,7 and 9 should be furnished. This study can be accomplished with the aid of minimal amounts of organic cosolvent such as acetonitrile. The study currently on hand (38°C and pH 1,7 and 9) is inadequate by itself to satisfy the long-term data needs associated with registering a new chemical and only imperfect estimates of rates kinetics can be obtained by extrapolating downwards in temperature from 38°C.

2. Results of field dissipation studies alluded to on page 6 of Shell's August 22, 1978 letter should be reported as soon as complete. Sufficient sampling intervals should be included so as to allow for an estimation of t-½ under various use conditions and/or in various geographic areas.

   Additional specific comments on field dissipation studies currently on hand are as follows:

   (A) Study TIR-24-259-75, Tab No. 15. The reporting of soil residues at the 0.01 ppm level is questionable based on data given for the analytical method used (MMS-R-425-1). No data are given for analyses of soil degradation products and, samples were taken at insufficient intervals (Only one interval was reported).

   (B) Study TIR-24-141-75-B Tab No. 16. Additional information is needed on SD-43775 recovery from soil by method MMS-R-478-1 to verify reported residue levels. No data are given for analyses of soil degradation product and insufficent sample intervals were reported. No samples were taken immediately after last application.

3. The rotational crop residue studies using ^{14}C labeled Pydrin (TIR -22-113-77) did not identify the nature of the residues in the plants. For example, in the case of 120 day rotated beets only 0.014 ppm (less than 10% of total) was identified as unmetabolized pesticide. Additional information should be provided as to the nature of these unidentified residues.

4. The possible increase in rotational root crop residues from season to season should be evaluated in the light of additional data obtained on the identity of such residues.

5. A rotational crop restriction for non-root crops of 270 days appears to be justified on the basis of the following:

   a. Residues for SD-43775 in rotation crops: sugar beets roots sugar beet tops, soybean vines and soybeans stalks were all

less than 0.01 ppm in crops planted 270 days after the last treatment. A total of 20 appplication over a period of two previous growing seasons, each at .0.2#/A had been applied.

b. Residues for SD-43775 in wheat and purple vetch planted 69 days after the last of 8-0.2 lb Ai/A applications of SD-43775 were less than 0.01 ppm.

c. Residues ^{14}C-SD 43775, labeled in the phenoxyphenol position of the molecule were all 0.01 ppm in brocolli, wheat straw and wheat grain when expressed as the parent compound. These plants were grown in soil treated at 1 lb Ai/A at a treatment/planting interval of 120 days.

A shorter rotational restriction also appears to be reasonable based on a review of the totality of the submitted rotational crop data. However, any such label restriction should be backed up by the following:

a. Additional data on the nature of the residues in rotational crops.

b. Residue data for a leafy vegetable and small grain crop at a shorter (than 270 day) post treatment/planting interval after one season of SD-43775 application at the maximum label rate.

6. It should be re-emphasized that the nature and amounts of Pydrin transformation products which may be present in rotational crops is not known and that the current tolerance for Pydrin residues in plant tissues is based only on the parent compound.

7. Data on mobility, soil metabolism, fish accumulation and, photodegradation appear to be adequate.

8. Effect of Pydrin on soil microorganisms: Representative soil microorganisms should be identified (to genus). Data on effects on soil algae such as Nostoc and on anaerobic N_2 fixers such as Clostridium are needed.

9. An activated sludge study should be furnished if this pesticide is to be manufactured in the United States.

Arthur O. Schlosser 1/17/79
Arthur O. Schlosser
Review Section No. 2
Environmental Fate Branch
12/11/78

Cur Collier 1/16/79

25

FENVALERATE

Page_____ is not included in this copy.

Pages 26 through 29 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.

__X__ 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.