

US EPA ARCHIVE DOCUMENT

24 DEC 1986

MEMORANDUM

SUBJECT: Registration Standard for fenamiphos -
Nontarget Insect Studies

FROM: Allen K. Vaughan, Entomologist
Ecological Effects Branch
Hazard Evaluation Division (TS-769-C)

PER: Henry J. Craven, Head-Section 4
Ecological Effects Branch
Hazard Evaluation Division (TS-769-C)

THRU: Michael W. Slimak, Chief
Ecological Effects Branch
Hazard Evaluation Division (TS-769-C)

TO: Sidney Jackson, PWT-21
Herbicide/Fungicide Branch
Registration Division (TS-767-C)

The Ecological Effects Branch (PER) has reviewed the non-target insect data received under the Registration Standard for fenamiphos. As data from an acute contact test indicate high toxicity to honey bees, residual toxicity testing on honey bees is required. This requirement is indicated in the data table.

Attached material includes OPP, topical summary, disciplinary review, and data table.

Attachment

cc: J. Heckman (OO/NEO)
C. Monroe (SIS)

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The Ecological Effects Branch (EEB) has reviewed the non-target insect data received under the Registration Standard for fenamiphos. As data from an acute contact test indicate high toxicity to honey bees, residual toxicity testing on honey bees is required. This requirement is indicated in the data table.

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cc: J. Heckman (OD/HED)
C. Monroe (SIS)

Fenamiphos Registration Standard - Nontarget Insects

Effects on Beneficial Insects

The following study received full review under this topic:

| <u>AUTHOR</u> | <u>ID</u> |
|---------------|-----------|
| Atkins et al. | 00036935 |

Study is outlined in Table 1.

Table 1. Toxicity study on beneficial insects with fenamiphos

| <u>Species</u> | <u>Formulation</u> | <u>Results</u> | <u>Author</u> | <u>Date</u> | <u>MRID#</u> |
|--|--------------------|--|------------------|-------------|--------------|
| Honey bee (<u>Apis mellifera</u>) | Technical | LD ₅₀ = 1.87 micrograms per bee (highly toxic) | Atkins et al. | 1975 | 00036935 |

There is sufficient information to characterize fenamiphos as highly toxic to honey bees. This study fulfills the guideline requirement for a honey bee acute contact LD₅₀ study.

Statement for Disciplinary Review

Effects of fenamiphos on beneficial insects

Fenamiphos was shown to be highly toxic to honey bees in a laboratory acute contact study (Atkins et al. 1975).

Bee Precaution Labeling

Labeling for fenamiphos products (excluding granular formulations) intended for outdoor use should bear the following statement:

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

This labeling is subject to change if data from the residual toxicity test indicate that residual toxicity is not a concern.

Reference (for Disciplinary Review)

Atkins, E.L.; Greywood, E.A.; Macdonald, R.L. (1975) Toxicity of Pesticides and Other Agricultural Chemicals to Honey Bees: Laboratory Studies. By University of California, Dept., of Entomology. ? : UC, Cooperative Extension, (Leaflet 2287; published study). MRID # 00036935.

TABLE A
GENERIC DATA REQUIREMENTS FOR FENAMIPHOS

| Data Requirement | Composition ^{1/} | Use Pattern ^{2/} | Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially) | Bibliographic Citation | Must Additional Data Be Submitted Under FIFRA Section 3(c)(2)(B)? ^{3/} |
|---|---------------------------|---------------------------|--|------------------------|---|
| <u>§158.155 Nontarget Insect</u> | | | | | |
| <u>NONTARGET INSECT TESTING - POLLINATORS:</u> | | | | | |
| 141-1 - Honeybee acute contact LD ₅₀ | TGAI | A,B | Yes | 00036935 | No |
| 141-2 - Honeybee - toxicity of residues on foliage | TEP | A,B | No | | Yes ^{4/} |
| 141-4 - Honeybee subacute feeding study | [Reserved] ^{5/} | | | | |
| 141-5 - Field testing for pollinators | TEP | A,B | No | | No ^{6/} |
| <u>NONTARGET INSECT TESTING - AQUATIC INSECTS:</u> | | | | | |
| 142-1 - Acute toxicity to aquatic insects | [Reserved] ^{7/} | | | | |
| 142-2 - Aquatic insect life-cycle study | [Reserved] ^{7/} | | | | |
| 142-3 - Simulated or actual field testing for aquatic insects | [Reserved] ^{7/} | | | | |
| 143-1 - <u>NONTARGET INSECT TESTING-</u> thru <u>PREDATORS AND PARASITES</u> | | | | | |
| 143-3 | [Reserved] ^{7/} | | | | |

1/ Composition: TGAI = Technical grade of the active ingredient; TEP = Typical end-use product.

2/ The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Nonfood; C = Aquatic, Food Crop; D = Aquatic, Nonfood; E = Greenhouse, Food Crop; F = Greenhouse, Nonfood; G = Forestry; H = Domestic Outdoor; I = Indoor.

3/ Data must be submitted no later than _____.

4/ As data from the acute contact test indicate high toxicity, data from a residual toxicity test are required.

5/ Reserved pending development of test methodology.

6/ This data requirement is imposed only on a case-by-case basis. Data reviewed under the standard to date do not indicate the need for a field study.

7/ Reserved pending Agency decision as to whether the data requirement should be established.

CASE G50108

FENAMIPHOS

PM 200 09/16/82

CHEM 100601

BRANCH EEB DISC 40 TOPIC 05050045

FORMULATION 00 -

FICHE/MASTER ID 00036935

CONTENT CAT 11

Atkins, E.L., Graywood, E.A., McDonald, R.L. (1975) Toxicity of Pesticides and Other Agricultural Chemicals to Honey Bees: Laboratory Studies. By University of California, Dept. of Entomology, UC, Cooperative Extension. (Leaflet 2287; published study.)

SUBST, CLASS # 8.

DIRECT RVN TIME (MM) START-DATE 12/22/86 END DATE 12/22/86

REVIEWED BY: Allen W. Vaughan
TITLE: Entomologist
ORG: EEB/HED
LOC/TEL: Crystal Mall #2 / 557-0783

SIGNATURE: *Allen W. Vaughan*

DATE: 12/22/86

APPROVED BY:
TITLE:
ORG:
LOC/TEL:

SIGNATURE:

DATE:

1. CHEMICAL: Multiple chemicals. See tables
2. FORMULATION: Technical
3. CITATION: Atkins, E.L., E.A. Greywood, and R.L. Macdonald. 1975. Toxicity of pesticides and other agricultural chemicals to honey bees. Laboratory studies. Univ. of Calif., Div. Agric. Sci. Leaflet 2287. 38pp.
FICHE/MASTER ID 00036935
4. REVIEWER: Allen W. Vaughan
Entomologist
EEB/HED
5. DATE REVIEWED: December 2, 1981
6. TEST TYPE: Toxicity to honey bee
 - A. Test Species: Honey bee (Apis mellifera)
7. REPORTED RESULTS: Fenamiphos (# 77) was determined to be highly toxic to honey bees in a laboratory acute contact toxicity test (LD50= 1.87 micrograms per bee). For data on other pesticides, see tables.
8. REVIEWER'S CONCLUSIONS: This study is scientifically sound, and shows fenamiphos to be highly toxic to honey bees. This study fulfills the guideline requirement for a honey bee acute contact toxicity study.

Materials and Methods

Test Procedures

A bell-jar vacuum duster is used to apply the pesticide, mixed with a pyrolite dust diluent, to the test bees. Dosages of dust are weighed, bees are aspirated into dusting cages and treated, and bees are then transferred into holding cages. Observations are recorded at 12, 24, 48, 72, and 96 hours.

Statistical Analysis

Analysis of the data was performed to enable the authors to determine LD50 values of pesticides from either dosage-mortality curves or from LC50 values. The slope value was also obtained from the dosage-mortality curve.

Discussion/Results

See tables for LD50 values, slope values, and toxicity categories.

Reviewer's Evaluation

A. Test Procedure

Procedures were sound.

B. Statistical Analysis

Analysis as performed by the authors was assumed to be valid. No validation was performed by EEB.

C. Discussion/Results

This study is scientifically sound.

by the other factors (0.5, 0.75, 1.25 and 1.5) to obtain the proper range of field dosages in pounds per acre. Then, using the slope value closest to the known slope value for the particular pesticide, the anticipated percent mortalities will be valid for that chemical.

We wish to emphasize that there are a few exceptions to the above rule of thumb method--those pesticides which are less hazardous as well as more hazardous than one can anticipate from the laboratory data.

It is our desire that, by presenting this data and these methods, decisions can be made (to select a pesticide, determine the dosage, and apply the chemical in the safest way and at the most appropriate time of day) maximizing the control of pest species while minimizing the adverse effects upon beneficial species in the treated area.

A list of the LD₅₀ and slope values determined at 48 hours after treatment at 80F (26.7C) and 65 percent relative humidity in the laboratory is given for 203 pesticides in table 1. A list of pesticides not toxic in the laboratory at dosages below 11 ug per honey bee is given for 196 pesticides in table 2. Other commonly used pesticide names or name designations appear together in tables 1 and 2. The pesticide names or other designations appearing in table 1 or 2 are arranged in alphabetical order in table 3 preceded with a numerical reference to their position in table 1 or 2 and giving the chemical definition.

*LD₅₀ is the lethal concentration of a chemical giving a bee mortality of 50 percent; LD₅₀ is the lethal dosage in micrograms per bee of a chemical giving 50 percent mortality.

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TABLE 1. LD₅₀ and Slope Values Showing the Comparative Toxicity to Honey Bees in the Laboratory at 48 Hours at 80°F (26.7°C) and 65-Percent Relative Humidity.

| Reference No. | Pesticide | LD ₅₀ in ug/bee | Slope Value |
|--------------------------------------|--|----------------------------|-------------|
| Group 1 - Highly Toxic to Honey Bees | | | |
| 1 | tepp | 0.001 | 0.64 |
| 2 | thionazin; Zinophos [®] ; Nemaphos [®] ; AC-18133; ENT 25380 | 0.042 | 9.68 |
| 7 | chlorpyrifos; Duesban [®] ; Dowco 179 | 0.114 | 7.80 |
| 4 | diefelza | 0.129 | 4.65 |
| 1 | carbofuran; Furadan [®] ; NIA-10242; ENT 27164 | 0.160 | 4.31 |
| 6 | petathion | 0.175 | 7.66 |
| 3 | GC-6706 | 2.178 | 8.19 |
| 8 | dimethoate; Cygon [®] ; OE-PEND [®] ; ENT 24650 | 0.188 | 7.94 |
| 9 | methidathion; Supratide [®] ; CS-13007; ENT 27197 | 0.276 | 9.06 |
| 10 | EPN; EPN-100 | 0.245 | 5.08 |
| 11 | HOE-2960; ENT 27764 | 0.268 | 9.19 |
| 12 | C-1307; ENT 27615 | 0.282 | 6.11 |
| 13 | aldicarb; Temik [®] ; UC-21149; ENT 17095 | 0.185 | 5.64 |
| 14 | methyl petathion | 0.291 | 6.24 |
| 15 | dicrotophos; Bidrin [®] ; SO-3562; ENT 24482 | 0.300 | 16.50 |

| | | | |
|----|--|-------|-------|
| 16 | phoxin; Valamin [®] ; Baythion [®] ; BAY-77488; ENT 27448 | 0.105 | 6.80 |
| 17 | phenothiaz; CIDEAL [®] ; Paphthion [®] ; BAY-33051; ENT 17386 | 0.306 | 4.91 |
| 18 | lanthion; Baytex [®] ; BAY-29493; ENT 25540 | 0.308 | 7.10 |
| 19 | Zectran [®] ; Dowco 179 [®] ; ENT 25766; mexicarbamate | 0.308 | 4.91 |
| 20 | monocrotophos; Asodrin [®] ; SO-9229; ENT 27129 | 0.370 | 7.77 |
| 21 | fensulfention; Dasanit [®] ; BAY-25141; ENT 24945 | 0.350 | 7.46 |
| 22 | aldrin | 0.351 | 4.98 |
| 23 | navinphos; Phoadrin [®] ; OS-2046; ENT 22374 | 0.360 | 7.96 |
| 14 | diazinon; OIAZINON [®] ; C-24480 | 0.371 | 8.97 |
| 25 | Meauro [®] ; BAY-9026; BAY-37344; ENT 25726 | 0.775 | 1.10 |
| 16 | Methyl Duraban; Dowco 114 | 0.363 | 10.23 |
| 27 | lanthrothion; Accothion [®] ; Poitichion [®] ; Sumichion [®] ; BAY-41831; CP-47114; ENT 25715 | 0.383 | 4.94 |
| 18 | NIA-10586 | 0.408 | 4.24 |
| 29 | lanphur; Famophos [®] ; CL-18023 | 0.417 | 4.85 |
| 30 | Mobam [®] ; MC-A-600; ENT 27041 | 0.423 | 3.99 |
| 31 | azinphosmethyl; Cuthion [®] ; BAY-17167 | 0.421 | 3.94 |
| 72 | isolan [®] ; G-21611 | 0.471 | 4.10 |
| 72 | naled; Osbrom [®] ; RE-4155 | 0.480 | 5.28 |

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| | | | | | | | |
|----|---|-------|-------|----|--|------|-------|
| 14 | steblovos; Vapona [®] ; DQVP | 0.495 | 8.91 | 39 | Orthene [®] ; Ortho 12420; EMT 27822 | 1.20 | 9.26 |
| 35 | BAY-91820; ENT 23639 | 0.519 | 12.80 | 60 | carbaryl; Sevin [®] ; Compd. 7744 | 1.24 | 2.45 |
| 36 | heptachlor; Valatcol 104 [®] ; Hepramul [®] ; Dritox [®] H-34 | 0.376 | 1.16 | 61 | Sevin 80S | 1.34 | 4.22 |
| 33 | CG-12968 | 0.330 | 8.92 | 62 | propoxur; abrocarb; Baygon [®] ; Unden [®] ; BAY-39001; OMS-15; ENT 23642 | 1.35 | 3.30 |
| 18 | lindane; gamma HHC | 0.362 | 5.03 | 63 | monitor; Yameron [®] ; BAY-31628; RE-9006 | 1.33 | 10.39 |
| 39 | Herculex 16526 | 0.324 | 8.40 | 64 | Cardona [®] ; Rabox [®] ; SD-8447 | 1.37 | 21.45 |
| 40 | Herculex 13425; ENT 21625 | 0.382 | 3.90 | 65 | AC-12008 | 2.38 | 1.60 |
| 42 | NIA-22633 | 0.609 | 1.53 | 66 | phosphamidon; Dimacron [®] | 1.46 | 14.28 |
| 42 | pirimiphos-ethyl; PP-222 | 0.626 | 25.22 | 67 | Methy2 Yr2thion [®] | 1.46 | 6.64 |
| 45 | NIA-10539 | 0.624 | 4.50 | 68 | C-8834; EMT 23409 | 1.46 | 3.92 |
| 44 | UC-8505 | 0.628 | 2.68 | 69 | Zao-Sytox | 1.49 | 1.45 |
| 45 | pirimiphos-methyl; PP-521 | 0.639 | 15.89 | 70 | methoxy1; Lannate [®] ; IN-2115; Mudrin [®] | 2.52 | 5.02 |
| 46 | malathion; Cyckion [®] | 0.209 | 8.04 | 72 | Abate [®] ; Biothion [®] ; AC-52260; XZ-52260; EMT 27265 | 2.53 | 2.85 |
| 43 | Bomy [®] ; GC-7307 | 0.243 | 9.09 | 32 | isodrin; Compd. 322 | 2.62 | 2.65 |
| 48 | Herculex 15662; EMT 27405 | 0.829 | 3.90 | 73 | BR-6624; EMT 22360 | 1.66 | 16.86 |
| 49 | UC-30043; EMT 27393 | 0.880 | 4.02 | 34 | HUX [®] ; Ortho 3352; RE-5555; EMT 23223 | 1.66 | 3.12 |
| 50 | Herculex 5727; UC-20834 | 0.933 | 4.34 | 15 | Herculex 9007; EMT 27554 | 1.66 | 1.30 |
| 31 | Meth92 iso-Sytox | 0.932 | 2.48 | 16 | Dow ET-25 | 2.83 | 6.12 |
| 52 | azinphosethyl; Ethyl Guthion [®] ; BAY-26239; EMT 22024 | 0.982 | 7.32 | 77 | Hemacur P [®] ; BAY-68238 | 2.87 | 5.23 |
| 33 | Sevin 4-022 | 2.02 | 4.72 | 28 | Sevin [®] 4 | 1.88 | 3.82 |
| 34 | C-9432; EMT 21564 | 2.04 | 8.36 | 29 | Z-2642 | 1.90 | 3.00 |
| 35 | imidan [®] ; Prostate [®] ; R-2504 | 1.06 | 4.17 | | | | |
| 36 | RP-11783 | 2.08 | 7.22 | | | | |
| 31 | CerQamit [®] ; promecarb; Schering 34623; ES-326; SN-326 | 1.23 | 2.22 | | | | |
| 38 | Matac12 [®] ; BAY-44646; EMT 25704 | 1.26 | 5.28 | | | | |

Group 12 - NoDetecacy Tox2t to Honey Bees

| | | | | | | | |
|-----|---|------|-------|-----|--|------|------|
| 80 | en0x2o; Compd. 269 | 2.02 | 4.20 | 102 | BAY-30922; EMT 25635 | 3.35 | 3.68 |
| 81 | RE-5030 | 2.08 | 5.28 | 103 | CG-10228 | 3.84 | 6.22 |
| 82 | leptophos; Aher [®] ; PHOSVEL [®] ; VCS-506; ENT 27338 | 1.29 | 5.80 | 104 | UC-6822 | 3.94 | 2.15 |
| 83 | Elacron [®] ; Q2orecarb; C-8553 | 2.22 | 2.98 | 105 | iodofenphos; Alfacron [®] ; C-9492; EMT 23408 | 3.99 | 3.12 |
| 84 | Herculex 2895 G | 2.23 | 2.84 | 206 | CG-9260; EMT 27254 | 4.09 | 3.98 |
| 85 | Ciodrin [®] ; SD-4294; crotoxyphos | 2.26 | 12.20 | 107 | CG-10284 | 4.29 | 3.21 |
| 86 | IC-12009 | 2.28 | 2.48 | 108 | Cyozana [®] ; E3-41032 | 4.23 | 1.32 |
| 82 | tr2thloromate; Igr2cox [®] ; BAY-33289; EMT 25222 | 2.55 | 2.26 | 209 | TD-25 | 4.29 | 5.64 |
| 88 | Bano2 [®] ; SOM [®] ; U-12927; carbamSate | 2.56 | 5.91 | 120 | carbophenanthion; Yr2thion [®] ; R-1303 | 4.42 | 8.29 |
| 89 | N-4543 | 2.48 | 2.36 | 222 | Parthane [®] ; Q-253 | 4.43 | 4.05 |
| 90 | Ortho 22515; #2-9; RE-22 | 2.32 | 4.55 | 212 | CG-9829 | 4.90 | 4.16 |
| 92 | demon; Sytlow [®] ; BAY-8269 | 2.60 | 1.85 | 125 | SD-7458 | 5.08 | 6.09 |
| 92 | E2-43084 | 2.62 | 4.55 | 224 | N2esol [®] ; H89A | 5.24 | 3.87 |
| 92 | AKTOM [®] ; SO-9098 | 2.66 | 4.07 | 125 | diflu2fcton; OI-Nyaton [®] ; BAY-29659 | 5.14 | 1.14 |
| 94 | G-30494 | 2.30 | 4.06 | 226 | chlordane | 5.23 | 3.24 |
| 95 | Pyramet [®] ; C-25330 | 2.95 | 4.07 | 117 | UC-2703AS; UC-34096; EMT 23413 | 5.55 | 2.23 |
| 96 | oxydemetonmethyl; Mera 99atoc-R [®] ; BAY-22097 | 3.00 | 2.22 | 228 | DDT, R, P' isomer | 5.56 | 4.42 |
| 97 | C-10023; EMT 23420 | 3.24 | 2.20 | 229 | SD-8448 | 5.14 | 8.72 |
| 98 | chlorDane, alpha & yltomers; HCS-2260 | 3.14 | 2.45 | 120 | ronnel; Kor2an [®] ; Tro2ene [®] ; Dow ET-14; Dow ET-57 | 5.34 | 2.10 |
| 99 | Cyrozana [®] ; ZI-47470 | 3.32 | 6.28 | 121 | Danomet [®] ; O-23425; EMT 23646 | 3.75 | 4.12 |
| 100 | TD-12 | 3.58 | 4.72 | 122 | CG-20202 | 3.28 | 8.38 |
| 101 | BAY-58156; EMT 23723 | 1.60 | 2.10 | 123 | O2metilan; Oimet2an [®] ; GS-13322 | 3.84 | 4.08 |
| | | | | 124 | DDT; ENT 1306 | 3.95 | 4.89 |
| | | | | 125 | isopropyl parathion; OXY-2168 | 6.41 | 6.86 |