MULTIPLE

CASE GS0109 TERBUFOS PM ~~04/15/82~~

CHEM 105001 Terbufos (S-(((1,1-dimethylethyl)thio)

BRANCH EEB DISC 40 TOPIC 05103545

FORMULATION 00 - ACTIVE INGREDIENT

FICHE/MASTER ID 00066220 CONTENT CAT 01

Atkins, E.L., Jr.; Anderson, L.D.; Kellum, D.; et al. (1976) Protecting Honey Bees from Pesticides. ?: Univ. of California, Div. of Agricultural Sciences. (Leaflet 2883; also in unpublished submission received Mar 20, 1980 under 432-502; submitted by Penick Corp., Lyndhurst, N.J.; CDL:243536-B)

SUBST. CLASS = S,

DIRECT RVW TIME = (MH) START-DATE 17 NOV 1982 END DATE 17 NOV 1982

REVIEWED BY: Allen W. Vaughan
TITLE: Entomologist
ORG: EEB/HED
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SIGNATURE: Allen W. Vaughan DATE: 11/29/82

APPROVED BY:
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LOC/TEL:
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7 pages

1. CHEMICAL: Multiple chemicals. See tables

2. FORMULATION: Technical

3. CITATION: Atkins, E.L., Jr.; Anderson, L.D.; Kellum, D.; et al, (1976) Protecting Honey Bees from Pesticides. ?: Univ. of California, Div. of Agricultural Sciences. (Leaflet 2883; also In unpublished submission received Mar 20, 1980 under 432-502; submitted by Penick Corp., Lyndhurst, N.J.; CDL:243536-B) FICHE/MASTER ID 00066220

4. REVIEWER: Allen W. Vaughan
Entomologist
EEB/HED

5. DATE REVIEWED: November 17, 1982

6. TEST TYPE: Toxicity to honey bee

A. Test Species: Honey bee (*Apis mellifera*)

7. REPORTED RESULTS: Terbufos (Counter) was determined to be moderately toxic to honey bees in a laboratory acute contact toxicity test. (LD50 = 4.09 micrograms per bee.) For data on other pesticides, see tables.

8. REVIEWER'S CONCLUSIONS: This study is scientifically sound, and shows terbufos to be moderately toxic to honey bees.

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.

GROUP I - HIGHLY TOXIC PESTICIDES
(LD_{50}=0.001-1.99 ug/bee)

Severe losses may be expected if the following materials are used when bees are present at treatment time or within a day thereafter, except as indicated by footnotes. (Arranged by toxicity to honey bees -- highest to lowest).

Pesticide	LD_{50} in [illegible]	Slope Value, [illegible]	Toxicity of Residue to Honey Bees: a/ No. Days	Bee Hazard
tepp 1/2/3/	0.001	0.64	0.5	H
resaethrin	0.063	4.67	-	-
chlorpyrifos, Dursban , Lorsban 2/	0.114	7.80	2-3.5	M-MH
dielorin 1/2/	0.139	4.65	1.5-5	H
carbofuran, Furadan 2/5/	0.160	4.31	3-5	M-H
parathion 1/2/	0.175	7.66	1	H-VH
dimethoate, Cygon, DE-FEND 2/	0.185	5.94	1-3.5	MH-VH
methldathion, Supracide 2/	0.236	9.06	2	MH
EPN 1/2/	0.245	5.08	1.5-3	H
aldicarb, Temik 1/2/5/7/	0.285	5.64	nil	nil b/
methyl parathion 1/2/	0.291	6.24	1	H-VH
dicrotophos, Bidrin 1/2/	0.300	16.50	2-4	M-MH
fenthion, Baytex 2/	0.308	7.20	-	-
mexacarbate, Zectran 2/	0.308	4.92	3	H
monocrotophos, Azodrin 1/2/	0.350	7.77	2-3.5	MH-VH
fensulfothion, Dasanit 5/	0.350	5.46	-	-
aldrin 2/	0.353	4.98	-	-
mevinphos, Phosdrin 1/2/3/	0.360	7.98	<1-1.5	M-H
diazinon, Spectracide 2/	0.372	8.97	1-2	H
methiocarb, Mesurol	0.375	3.20	-	-
fenitrothion, Sumithion	0.383	4.94	-	-
famphur, Famophos	0.417	4.85	-	-
azinphos-methyl, Guthion 1/2/	0.423	6.84	1.5-3	LM-M
naled, Dibrom 2/3/	0.480	18.18	<1-1.5	MH-VH
DDVP, dichlorvos, Vapona 2/	0.495	8.97	-	-
heptachlor 1/2/	0.526	5.16	-	-
lindane 2/	0.562	5.07	-	-
BHC2/	0.562	5.07	-	-
malathion, Cythion 2/4/	0.709	8.04	1-2	L-MH
azinphos-ethyl, Ethyl Guthion	0.981	7.32	-	-
Imidan 2/	1.06	4.77	2	MH-H
aminocarb, Matacil	1.12	3.61	-	-
acephate, Orthene 2/	1.20	8.26	2.5	M-MH
methomyl, Lannate Nudrin 2/5/	1.29	2.39	2	L-M
carbaryl, Sevin 2/	1.34	2.45	3-8.5	M-VH
propoxur, Baygon 2/	1.35	3.30	-	-
Gardona, tetrachlorvinphos 2/	1.37	21.45	3.5-5	LM-M

methamidophos, Monitor, Tameron 2/	1.37	10.32	2.5-3	LM
phosphamidon, Dimecron 2/	1.46	14.28	2-5	M-VH
metalkamate, Bux	1.66	5.12	-	-
pyrazophos, Afugan	1.85	3.48	-	-
phenamiphos, Nemacur P	1.87	5.25	-	-
arsenicals	75.48	3.98	-	-

GROUP II - MODERATELY TOXIC PESTICIDES
(LD^{50}=2.0-10.99 ug/bee)

These can be used in the vicinity of bees if dosage, timing and method of application are correct, but should not be applied directly on bees in the field or at the colonies. (Arranged by toxicity to honey bees -- highest to lowest).

Pesticide	LD_{50} in ug/bee	Slope Value, Probits	Toxicity of Residue to Honey Bees: a/ No. Days	Bee Hazard
temophos, Abate 2/	1.55	2.85	0-3	L
endrin 1/2/	2.02	4.20	1-3	L-M
leptophos, Phosvel 2/	2.19	5.80	2-2.5	M
crotoxyphos, Ciodrin	2.26	17.10	-	-
trichloronate, Agritox	2.33	3.26	-	-
carbanolate, Banol	2.36	5.91	-	-
ethoprop, Mocap	2.58	2.84	-	-
demeton, Systox 1/2/	2.60	1.85	1	L
Pyramat	2.95	4.07	-	-
oxydemeton-mathyl, Metasystox-R 2/	3.00	2.32	0.5	ML
Counter (terbufos)	4.09	3.54	-	-
carbophenothion, Trithion 2/	4.47	8.39	<1	L
Perthane	4.47	4.05	-	-
disulfoton, Di-Syston 1/6/	5.14	1.14	-	-
ronnel, Korlan	5.62	2.11	-	-
DDT 1/2/10/	5.95	4.89	<1-1	L-LM
mirex, Dechlorane	7.15	3.23	-	-
endosulfan, Thiodan 2/	7.81	3.15	2-3	L-MH
chlorfane 2/	8.80	2.34	-	-
phosalone, Zolone	8.94	3.83	-	-
phorate, Thimet 1/2/6/	10.07	1.34	<1-1	L c/
oxamyl, Vydate 2/	10.32	6.43	3-4	MH
formetanate, Carzol 2/	14.27	3.97	2	L

a/ Toxicity of residue to honey bees. No. Days - represents average time in days that residue is toxic to honey bees; Bee Hazard - represents severity of the honey bee hazard: L = low; M = moderate; H = high; LM = moderately low; MH = moderately high; VH = very high; nil = no toxicity and no hazard; - = no verified information available.

b/ Used only as soil application and/or as granules.

c/ When used as soil application of granules, No. days toxic, nil; Hazard, nil.

1/ California state regulation requires permits for most uses of these materials; also for 2,4-D and 2,4,5-T as weed treatments but not as hormone sprays on citrus.

2/ These materials have been laboratory tested and field tested mainly on alfalfa, citrus, cotton, ladino clover, milo and sweet corn; all others are laboratory tested only.

3/ Dibrom®, Phosdrin® and tepp have such short residual activity that they kill only bees contacted at treatment time or shortly thereafter. These materials usually are safe to use when bees are not in flight; they are not safe to use around colonies.

4/ Malathion has been used on thousands of acres of blooming alfalfa without serious loss of bees. However, occasional heavy losses have occurred, particularly under high temperature conditions. If applied to alfalfa in bloom, it should be only as a spray, and treatment should be made during the night or early in the morning when bees are not foraging in the field. Undiluted technical malathion spray should not be used around bees.

5/ Nematocide.

6/ Di-Syston® and other systemic pesticides used as seed treatments have not caused bee losses.

7/ Temik®, although highly toxic to bees as a contact poison, is used only in granular form and extensive field usage has not resulted in bee losses.

8/ Defoliant.

9/ Desiccant.

10/ DDT has been temporarily withdrawn from most uses in the U.S.A.