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DATA EVALUATION RECEIVED

PAGE 1 OF

CASE GS0014

ENDCSULFAN

EM 110 08/12/79

CHEM C79401

Endosulfan ( hexachlorhexahydroethano

FRANCH FEB DISC 40 TOPIC 05050025

FORMULATION 12 - EMULSIFIABLE CONCENTRATE (EC CR E)

FICHE/MASTER ID 05003360

CONTENT CAT C1

Singh, M.; Sharma, E. I.; Dhaliwal, H.S. (1974) Toxicity of insecticides to honeybee workers, *Apis cerana indica* F. Pesticides 8(12):28-29.

SUBST. CLASS = S.

DIRECT RVW TIME = 1 1/2 hr. (MH)

START-DATE 12/3/79

END DATE 12/4/79

REVIEWED BY: Allen W. Vaughan  
TITLE: Entomologist  
ORG: EEB/HED  
LCC/TEL: Crystal Mall #2/71405

SIGNATURE: *Allen W. Vaughan*

DATE: 2/14/80

APPROVED BY:  
TITLE:  
ORG:  
LCC/TEL:

SIGNATURE:

DATE:

1. CHEMICAL: Multiple chemicals. See table.
2. FORMULATION: Multiple formulations. See table.
3. CITATION: Singh, M., P.L. Sharma, and H.S. Dhaliwal. 1974.  
Toxicity of insecticides to honeybee workers, Apis cerana indica F. Pesticides 8(12):28-29.  
ID 05003360
4. REVIEWER: Allen W. Vaughan  
Entomologist  
EEB/HED
5. DATE REVIEWED: December 3, 1979
6. TEST TYPE: Acute toxicity to honeybee  
A. Test species: Indian honey bee (Apis cerana indica)
7. REPORTED RESULTS:

Of the 15 pesticides evaluated, menazon was found to be least toxic to the Indian honeybee, followed by endosulfan. DDT and malathion were considered moderately toxic. The remaining pesticides tested were all highly toxic to Apis cerana. For  $LC_{50}$  values, see table.

8. REVIEWER'S CONCLUSIONS:

This study is scientifically sound.

RELATIVE TOXICITY OF DIFFERENT INSECTICIDES  
TO Apis cerana indica WORKERS BY TOPICAL

UNITS  
(PPB, ? ? ?)

SPRAY  
dependence upon 'doses'

Name of insecticide	LC <sub>50</sub>	Fiducial limits at LC <sub>50</sub>	Relative toxicity
Menazon 70% (Sayfos 70 DP)	0.48260	0.52550 0.44320	1.000
Endosulfan 35% (Thiodan 35 EC)	0.45030	0.48840 0.41520	1.072
DDT 50% (Guesarol 550 WP)	0.08422	0.09974 0.07111	5.730
Malathion 50 EC	0.04289	0.04870 0.06779	11.252
Methyl demeton 25% (Metasystox 25 EC)	0.03535	0.03782 0.03303	13.652
Carbaryl 50% (Sevin 50 WP)	0.02966	0.03824 0.02299	16.271
Phosphamidon 100% (Dimecron 100 EC)	0.02497	0.02791 0.02234	19.327
Formothion 25% (Anthio 25 EC)	0.02496	0.02962 0.02102	19.335
Gamma BHC 20% (Lindane 20% EC)	0.02379	0.02847 0.01986	20.286
Ethyl parathion 46% (Folidol E 60S)	0.01955	0.02096 0.01824	24.685
Thiometon 25% (Ekatin 25 EC)	0.01874	0.02144 0.01637	25.752
Methyl parathion (Metacid 50 EC)	0.01792	0.01912 0.01679	26.931
Diazinon 20% (Basudin 20 EC)	0.01524	0.01689 0.01374	31.667
DDVP 100% (Novan 100 EC)	0.01509	0.01584 0.01437	31.981
Dimethoate (Rogor 30 EC)	0.01237	0.01381 0.01109	39.014

In none of these cases the data were found to be significantly heterogeneous at P=0 - 05. LC<sub>50</sub> = concentration calculated to give 50 percent mortality.

Materials and Methods

Test Procedures

Test bees were placed in glass jars and sprayed under a spraying tower. After treatment, bees were allowed to dry (5 min.) and then transferred to screen cages. Sugar solution was provided. Mortality was recorded 24 hours after treatment.

Statistical Analysis

Percent mortality for each concentration was calculated and corrected with Abbott's formula. Corrected mortality was subjected to probit analysis. The relative toxicity of different insecticides was calculated by taking the LC<sub>50</sub> value of menazon as unity.

Discussion/Results

LC<sub>50</sub> values are presented in the table. On the basis of the results, the authors classified the test insecticides into the following groups:

Group I (Highly toxic): methyl demeton, carbaryl, phosphamidon, formolnion, gamma BHC, ethyl parathion, thiometon, methyl parathion, diazinon, DDVP, and dimethoate.

Group II (Moderately toxic): DDT and malathion.

Group III (Relatively least toxic): menazon and endosulfan.

Reviewer's Evaluation

A. Test Procedure

Procedures were scientifically sound.

B. Statistical Analysis

Analyses as performed by the authors were assumed to be valid.

C. Discussion/Results

This study is scientifically sound.