2-18-71

FTSanders:REMey:cw
February 1?, 1971

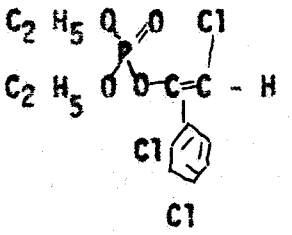
Evaluation of Pesticide Petition Number OF0991
for 2-Chloro-1-(2,4-dichlorophenyl) vinyl diethyl
phosphate (Supona)
Submitted by William Cooper and Nephews, Inc.
Filed December 1, 1970

I. Introduction

1. Supona and Compound 4072 are the trade names generally ascribed to 2-Chloro-1-(2,4-dichlorophenyl) vinyl diethyl phosphate which is an insecticide. Also called chlorfenvinphos.

2. Fact about Supona.

The chemical structure is:



Empirical formula C_{12} H_{1y} O_y Cl_3 P

Physical and Chemical Properties

Molecular Weight	359.5
Physical State	Liquid
Specific Gravity	1.36
Vapor Pressure mm of Hg	1.7×10^{-7}
M.P.	-2 to -9°F
B.P.	333 to 338°F
Flammability	Nonflammable
Color	Amber
Odor	Mild Chemical
Solubility	Miscible with Acetone, Alcohol, Kerosene, Corn Oil, and Propylene Glycol. Sparingly soluble in Water
Corrosive Action	May be Corrosive to Iron, Steel, and Brass
Stability	Stable when Stored in Glass.

I. Introduction (Cont.)

3. Composition of 4072

39.0% Beta isomer
6.5% Alpha isomer
[redacted]

4. The petitioner is proposing the following tolerances:

Milk	Less Than	0.002ppm
Fat	Less Than	0.002 ppm
Eggs	Less Than	0.001 ppm
Tissues of Chickens	Less Than	0.001 ppm

5. The name and formulation of the product is as follows:

RESIDUAL SURFACE SPRAY AND LARVICIDE (Reg. No. 59-144)

Compound 4072 (Supona)	21.1%
Heavy Aromatic Naphtha	62.0%
Inerts	16.9%

1 gal make 40 gal. of spray

II. Directions for Use

1. Dilution inside and outside

Water	1 gal	5 gal	10 gal	20 gal
Product	3 1/2 oz	1 pt	1 qt	1/2 gal

2. Inside

Spray walls, ceilings, partitions, and stalls at 1 gal. diluted spray to 500-1000 sq. ft. of area. Do not spray to runoff. Should control housefly for 12 wks.

3. Dairy Barns

Remove all animals, cover waterers, feed bunks, feed troughs, and feed containers. Remove all milking utensils and milk containers.

4. Outside

Spray outside walls, fence post, around feed troughs, manure piles, yards, and similar places. Apply 1 gal/1000 sq. ft. of area.

PRODUCT IMPURITY INFORMATION IS NOT INCLUDED

II. Directions for Use (Cont.)

5. Larvicide

Initial Cleanup		Monthly Cleanup	
Product	Water	Product	Water
2 1/2 oz	1 gal	3/4 oz	1 gal
10 1/2 oz	5 "	3 1/2 oz	5 "
20 oz	10 "	6 1/2 oz	10 "
3 pt	25 "	1 pt	25 "

6. Poultry dropping inside poultry houses

Cleanup 1 gal/25 sq. ft. of area. Monthly repeat every 2 wks.

7. Cautions

Remove livestock before spraying.
Do not apply directly to livestock and poultry.
Do not use inside homes.
Do not contaminate feed or water troughs and feedstuffs.

III. Analytical Methods

[redacted]

IV. Discussion of Data QUALITY CONTROL PROCEDURE INFORMATION IS NOT INCLUDED

1. A study was begun October 16, 1968, to determine if the insecticide residues could be detected in the tissues of beef calves and the milk of lactacting dairy cows held continuously in barns treated with residual sprays of Compound 4072 for control of houseflies.

To simulate barn facilities, six rooms ranging in size from 300 to 700 sq. ft. each were constructed by enclosing the sides and ends of the holding pens with new, unpainted plywood panels.

Residual sprays were applied to the interior surfaces of the holding rooms at the recommended rate and concentration of 1 gal. of 0.5% spray/500 sq. ft. surface area; or at 5 times the recommended concentration (1 gal of 2.5%/500 sq. ft.); or at 10 times the recommended concentration (1 gal of 5%/500 sq. ft.)

Three dairy cows each were held in 3 holding rooms and 3 beef calves each in the remaining 3 rooms 1 week prior to

IV. Discussion of Data (Cont.)

treatment. The animals were held outside the building during the times the rooms were being sprayed and were put back into their respective rooms 5 hours after treatment. Each treatment level was applied to one room containing cows and containing beef calves. In addition 3 beef calves were outdoors in a holding pen and served as untreated controls.

Three dairy cows each were held in 3 holding pens and 3 beef calves each in the remaining 3 rooms 1 week prior to treatment. The animals were held outside the building during the time the rooms were being sprayed and were put back into their respective rooms 5 hours after treatment.

Animals were held in the holding rooms continuously except when the rooms were cleaned (twice daily) and when the cows were being milked. Total estimated time for the cows outside the rooms was 1 hour per day (28 day test period) and for the beef calves 20-30 minutes per day (32 day test period).

Milk samples were taken from each cow at 1 day pretreatment and 1, 4, 8, 12, 20, and 28 days post-treatment. Morning and evening milk obtained the same day were combined in proportion to the quantity of milk obtained at each milking and a sample for residue analysis was taken from the combined milk.

Samples of omental fat taken by omentectomyl were obtained from 1 calf from each treatment group and 1 control calf at 4, 8, and 11 days post-treatment. At 32 days post-treatment 2 calves from each treatment group and 2 control calves were slaughtered and samples of omental and renal fat, liver, heart, kideny, and muscle were taken from each calf.

No residue were detected in either the milk samples from the dairy cows or the tissues samples from the beef calves slaughtered at 32 days post-treatment. Residues detected in the fat samples taken by omentectomy are summarized below

Conc. of Barn Spray	Days after Spraying	Compound 4072 in fat (PPM) on extracted fat
Control	4	0
0.5	4	0
2.5	4	0.007
5.0	4	0.020

IV. Discussion of Data (Cont.)

Conc. of Barn Spray	Days after Spraying	Compound 4072 in fat (PPM) on extracted fat
0.5	8	0
2.5	8	0.007
5.0	8	0.007
0.5	16	0
2.5	16	0.002
5.0	16	0.007

2. Analysis of Eggs, Manure and Body Tissues of Chickens

The manure under the cages in 3 chicken houses was treated with Compound 4072 for housefly control. In one house the manure was sprayed at the rate of 1 gal/25 sq. ft. with the recommended concentration of 0.41%. A 2nd house was treated with 5 times, and 3rd with 10 times the recommended concentration. Two hens from each house were slaughtered 4, 8, and 12 days post-treatment and samples of the body tissues taken for analysis. Egg samples were taken at the same intervals. The samples were analyzed by a method that would detect 0.001 ppm. The only residues detected were in samples of skin from hens taken from the houses treated with 2 higher concentrations. The maximum residue found was 0.004 ppm. The residue of Compound 4072 in the manure showed no signs of decomposition in 16 days.

Residues of Compound 4072 in eggs and the body tissues of chickens confined in cages where the manure underneath was sprayed for fly control. Only the high rate is listed below.

Conc. of Spray	Days after Spray	Eggs	Fat	Liver	Skin	Breast	Thigh
Control	0	0	0	0	0	0	0
4.1%	4	0	0	0	0.002	0	0
4.1%	8	0	0	0	0.004	0	0
4.1%	12	0	0	0	0.001	0	0

Analysis of chicken manure sprayed with Compound 4072 for fly control.

Conc. of Spray (%)	Days after Treatment	Comp. 4072 PPM
0.41	4	38
0.41	8	32
0.41	12	9.7

IV. Discussion of Data (Cont.)

Conc. of Spray (%)	Days after Treatment	Compd. 4072 PPM
0.41	16	22.8
2.05	4	202
2.05	8	197
2.05	12	169
2.05	16	124
4.1	4	610
4.1	8	500
4.1	12	352
4.1	16	329

Recovery Study

3. Recovery studies using milk purchased on the open market are reported. The percent recovery for some of the milk samples was below 65%.

4. Determination of Residues in milk

A number of dairy barns were treated (sprayed) with Compound 4072. Milk from cows quartered in the barns was taken prior to treatment and at intervals after treatment. The milk was analyzed for 4072 to determine whether treatment of the barns led to residues of the pesticide in milk.

The barns were sprayed with 100, 50, 25, and 20 mg/sq ft of Compound 4072. One barn was sprayed with 10 mg/sq ft and then resprayed 40 days later. Samples were taken at 1, 2, 5, 6, 7, 8---and 30 day intervals. The amount of residue found in milk taken from all the barns was nil.

5. Residues of Supona in Sheep

Sheep tissue was analysis to determine the following:

1. The concentration of Supona and trichloroacetophenone (TCAP) in the various depot fats of the sheep and the rate at which the residue levels decreased with time after application.

2. The distribution of Supona and TCAP in the various tissue of sheep.

3. The presence of any chemically bound Supona or TCAP in the tissue.

IV. Discussion of Data (Cont.)

Recovery Study

The mean percentage recoveries for six samples of fat and six samples of organs were: Trichloroacetophenone, fat 85%, organ 67%, Supona, fat, 73%, organs 75%.

Recovery studies appear to indicate that Supona and TCAP are bound in the tissue or that the method is questionable.

Residues of Supona found in fatty tissue

No Supona was detected in omental fat before treatment.

Sheep were dipped in 0.1% Supona for 1 minute.

Days Between Treatment and Slaughter	PPM Perirenal	PPM Omental	PPM Pericardial
7	N.D.	0.035	N.D.
7	0.015	0.043	N.D.
14	N.D.	0.012	0.005
14	N.D.	0.007	N.D.
21	N.D.	N.D.	N.D.
21	0.003	N.D.	0.016

The major organs taken from two sheep 7 days after dipping in a wash containing 0.1% w/v Supona (double the intended usage strength) were analyzed. No Supona or TCAP residues were detected in any of major organ examined.

6. P^{32} Study using 0.25% 4072 emulsion

Tissue	Recovery %	days after spraying in PPM 7	16	28
Omental fat	71	0.085	0.006	0.005
Renal fat	71	0.021	0.005	0.005
Muscle	87	0.004	0.004	0.004
Heart	87	"	"	"
Kidney	82	"	"	"
Liver	87	"	"	"
Brain	92	"	"	"
Spleen	90	"	"	"

The study with P^{32} labeled Compound 4072 indicated that the application of 0.25% sprays was followed by the appearance of residues only in the fatty tissues. The residue reached a maximum on or after the 3rd day after spraying had decreased rapidly at 7 days and were climinated in 15 days after spraying.

IV. Discussion of Data (Cont.)

7. Absorption and Elimination of General Chemical 4072 Applied Dermally to Cattle

Studies were conducted on the absorption and elimination of P^{32} labeled General Chemical 4072 when sprayed on cattle at dosages equivalent to conventional 0.1%, 0.25%, and 0.5% sprays. The amount of radioactive material in the blood reached a maximum concentration 2 hours after treatment, which indicate rapid absorption of the insecticide or its products by the skin of cattle. The elimination of the insecticide or its products was also rapid, as shown by the low concentrations in the urine and feces 1 week after treatment. Urinary excretion accounted for 25% to 32% of the applied doses, whereas fecal elimination accounted for 1.6% to 2.1%.

V. Conclusion

1. We need to know the identities of the [redacted] in the composition of GC 4072.

2. We need to know if [redacted] is a metabolite of GC 4072 or a manufacturing impurity or both.

3. The analytical method submitted is not complete. We need the complete method, recovery data and raw data. The method will only detect Supona and maybe P containing metabolites. Studies indicate that the P linkages is lost and that the metabolites should be detected by some other method.

4. The proposed tolerance may be lower than background and/or the sensitivity of the method.

VI. Recommendation

No opinion is given. See conclusion.

Note - label directions include applications to yards and similar places. To support this we would need answers to PR Notice 70-15. We need to know if treated manure when used as a fertilizer would result in residues in the food chain.

PRODUCT IMPURITY INFORMATION IS NOT INCLUDED

February 12, 1971

Subject: Opinion for Tolerance
Pesticide Petition Number 0F0991
Tolerances for 2-Chloro-1-(2,4-dichlorophenyl) vinyl diethyl phosphate (Supona) "GC 4072"
Submitted by William Cooper and Nephews, Inc.
Filed December 1, 1970

To: C. L. Smith, Head
Petitions Control Office

PRODUCT IMPURITY INFORMATION IS NOT INCLUDED

1. No opinion is given for the proposed tolerances in milk, fat, eggs, and tissues of chickens for the following reasons:

   1. We need to know the identities of the [redacted] in the technical product.

   2. We need to know if [redacted] is a metabolite of Compound 4072 or a manufacturing impurity.

   3. A complete method of analyses, recovery, and raw data must be submitted.

   4. The analytical method determines phosphorus containing compounds. We need to know what residues, if any, may present as non-phosphorus metabolites.

   5. The proposed tolerances may be lower than natural background and the sensitivity of the analytical method.

Mr. Smith send out the following:

   1. Label directions include applications to yards and similar places. This type use is vague and should be supported with answers to PR Notice 70-15.

   2. We need to know if the treated manure (containing Supona and/or its degradation products) would result in residues in the food chain when used as a fertilizer.

Chemicals Evaluation Staff

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