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OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

File

MEMORANDUM

SUBJECT: Sulfotepp Contamination of Diazinon

TO: John W. Melone, Director
Hazard Evaluation Division (TS-769)

FROM: Robert P. Zendzian PhD, Acting head
Review Section IV
Toxicology Branch
HED (TS-769)

312 8185 345

THROUGH: Theodore M. Farber PhD, Chief
Toxicology Branch

The sulfotepp contamination of diazinon at the levels cited in the memo from Dean Hill (Dec 7, 1984) are of no known toxicological significance.

Discussion

Sulfotepp is a common contaminate of the pesticide diazinon particularly in technical material manufactured outside the United States. That technical material manufactured by Ciba-Geigy is stabilized to prevent further conversion of diazinon to sulfotepp.

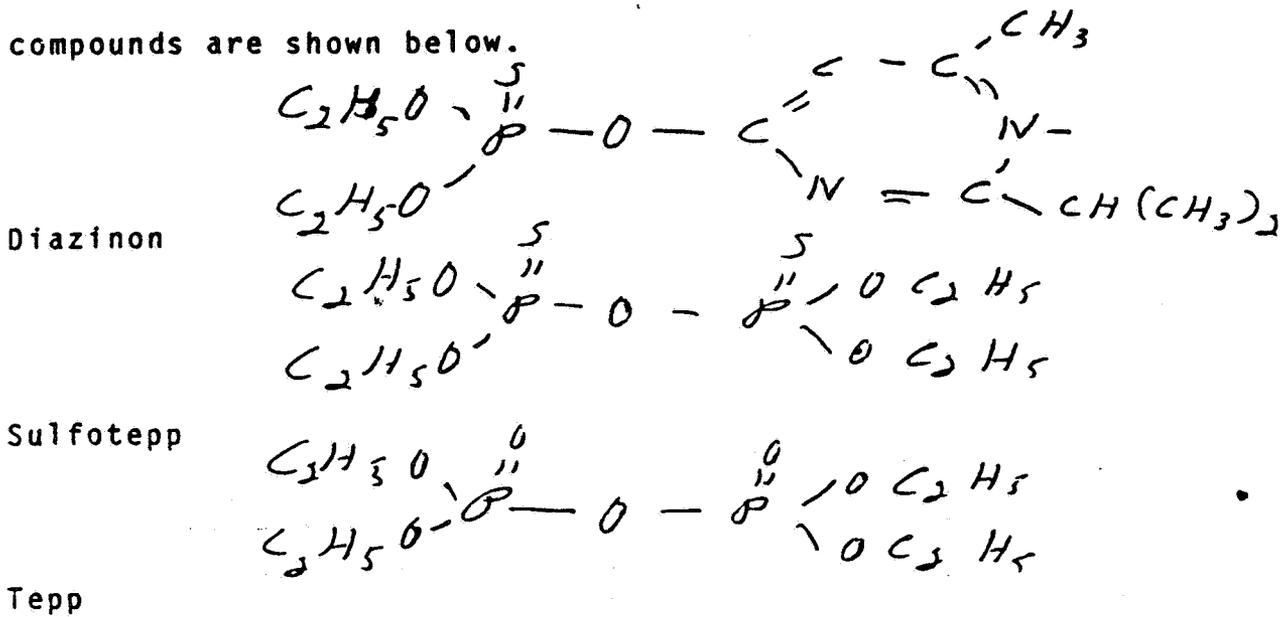
The Hill memo gives the following concentrations of sulfotepp in various commercial technical material.

<u>Source</u>	<u>Concentration of Sulfotepp</u>	
	ppm	%
Ciba-Geigy (U.S.)	260	0.026
Ciba-Geigy (France)	200-300	0.020 - 0.030
Nippon-Kayaku (Japan)	3500-5500	0.35 - 0.55
Makhteshim (Israel)	1900-2300	0.19 - 0.23

The maximum residue is in the product from Japan and this memo will address its toxicity.

Both sulfotepp and diazinon must be oxidized to the oxygen analogue which is the biologically active compound. These compounds are toxic by virtue of their ability to inhibit cholinesterases. The structures of the critical

compounds are shown below.



Diazinon has published tolerances in a wide variety of crops (40 CFR 180.153). There are no published tolerances for sulfotepp which is commercially known as Bladafum. Tepp has negligible residue tolerances of 0.01ppm (40 CFR 180.347).

The known toxicity data base for the three compounds is as follows.

	<u>Diazinon</u>	<u>Sulfotepp</u>	<u>Tepp</u>
Oral LD50	400mg/kg	10mg/kg	1mg/kg
Subchronic	NOEL = 0.02 mg/kg/day dog	no data	NOEL = 0.1 mg/kg/day rat and dog
Teratology	Negative at 100mg/kg-rabbit	no data	no data
Neurotoxicity	Negative	no data	negative
Reproduction	NOEL = 0.4 mg/kg/day rat	no data	no data
Chronic	No systemic effects in dog and rat	no data	no data
Oncogenic	Negative in rat and mouse	no data	no data

Based on their structural relation one may reasonably expect no qualitative differences in the toxicity of the three compounds. However, a thorough comparison of the toxicity of

these compounds, other than acute lethality, would require additional studies.

The toxic effect of concern in the contamination of diazinon with sulfotepp is acute lethality. When two compounds have the same mechanism of lethality, as diazinon and sulfotepp do, it is possible to make some predictions about their combined lethality. Three approaches will be used.

1. Figure 1 is a plot, on semilog paper, of the respective LD₅₀ values versus their concentration. Thus at 100% sulfotepp the LD₅₀ is 10mg/kg and at 100% diazinon the LD₅₀ is 400mg/kg. For a mixture containing 0.55% sulfotepp, it would not be possible to detect a decrease in LD₅₀ (increase in toxicity) on this plot. To double the toxicity of the mixture (half the LD₅₀) it would be necessary to have in the order of 20% sulfotepp in the mixture.

2. Based on kinetic considerations, contamination of a pesticide with a more lethal compound having the same mechanism of lethality will not cause a toxicologically significant increase in lethality of the mixture until the ratio of the quantity of the more lethal to the less lethal exceeds the ratio of their respective LD₅₀'s. For the subject compounds contamination sufficient to cause an increase in lethality would require more than 2.5% sulfotepp in diazinon. The maximum sulfotepp contamination reported is 0.55%.

3. Consideration of the total quantity of the mixture necessary to produce an LD₅₀ of each component.

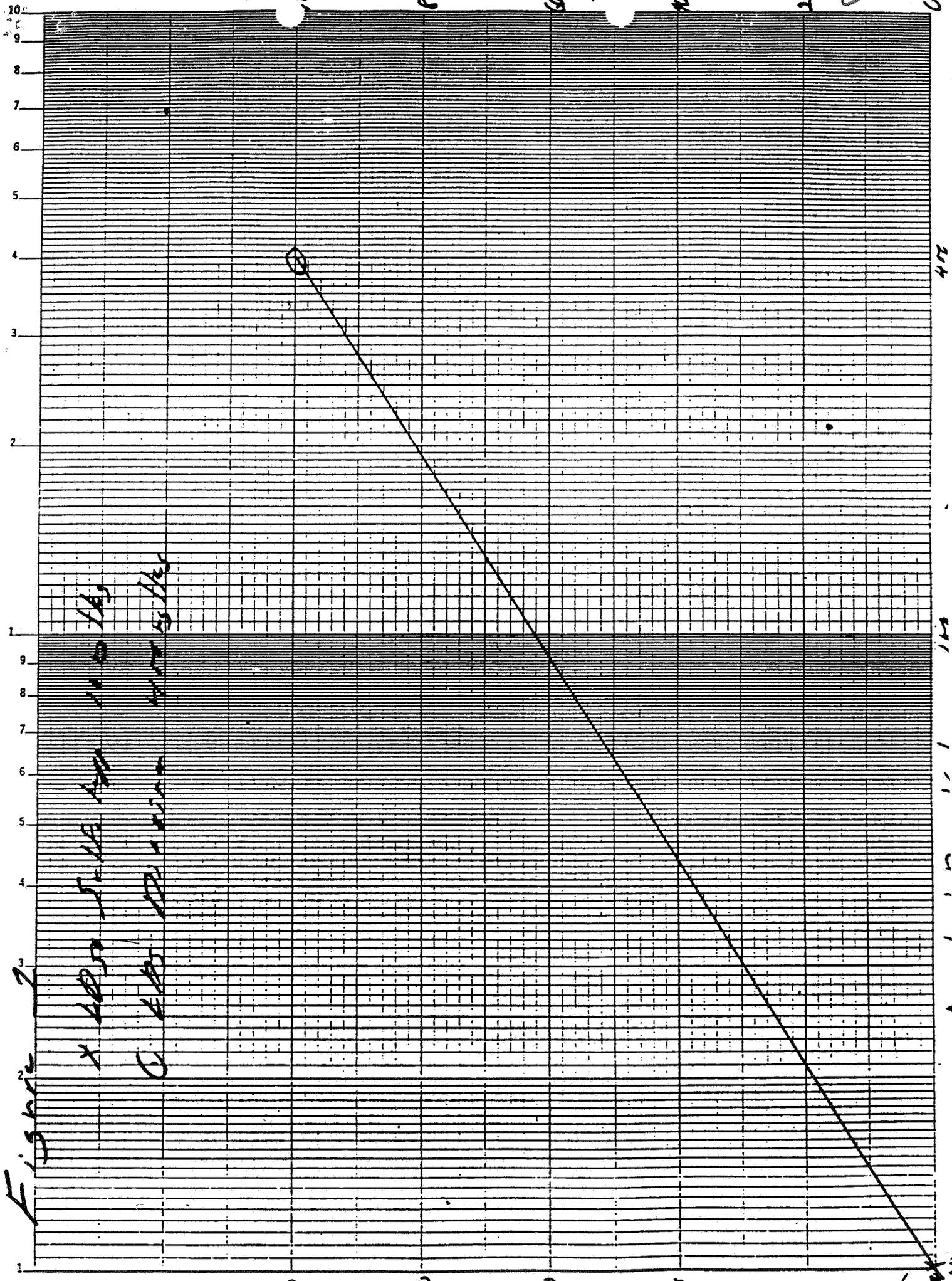
a. The most contaminated diazinon contains 0.55% sulfotepp.

b. One LD₅₀ of diazinon (400mg) contains 2.2mg of sulfotepp (22% of an LD₅₀ of sulfotepp).

c. One LD₅₀ of sulfotepp (10mg) is contained in 1818mg of diazinon (4.5 times the LD₅₀ of diazinon).

Conclusion

From these considerations one may conclude that the quantities of sulfotepp reported as contaminating diazinon will not significantly increase the toxicity of the mixture.



Figure

X 4000
Y 100
Z 100
W 100

Percent Distribution

400

100

100

100

100

100

100

100