

DATE: October 15, 1978

To: Product Manager, Miller (16):
TS-767

Through: Dr. Gunter Zweig, Chief
Environmental Fate Branch

Through: Mr. James Conlon, Acting Director
Hazard Evaluation Division, TS-769

From: Review Section No. 1 *RC/pey*
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No. 100-LOT

Chemical: Curacron O-(4-Bromo-2-chlorophenyl)-O-ethyl-S-
propyl phosphorothioate

Type Product: (I,) D, H, F, N, R, S, _____

Product Name: Curacron 6E Insecticide

Company Name: CIBA-GEIGY

Submission Purpose: Data response to review of 5/26/78
and telephone conversation of 10/16/78.

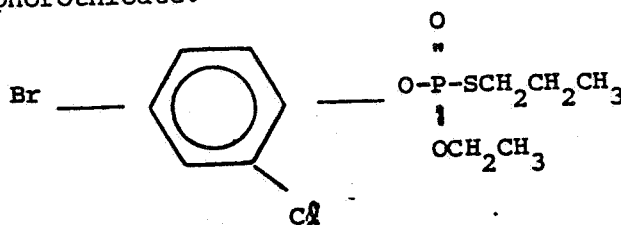
Date in: 11/15/78

Date out: 11/16/78

Structure:

1.0 Introduction

1.1 Curacron O-4-Bromo-2-chlorophenyl)-O-ethyl-S-propyl phosphorothioate.



1.2 This is a submission of answers to questions that were asked concerning the microbial studies of the review of 5/26/78; with further recommendations from phone conversation of October 16, 1978.

2.0 Discussion of Data

A) The following paragraphs are the comments from the review of 5/26/78.

The data submitted concerning effects on microbes contain too many discrepancies to permit conclusions to be drawn.

In a recently submitted study by C. D. Ercegovich (2/15/78), CGA-15324 and bromochlorophenol at 5 ppm significantly inhibited one bacterial population out of nine and six fungal populations out of fourteen tested. Microorganisms were incubated on potato dextrose agar for not more than 13 days or hours (depending on table 2 or 4, whichever is correct) to determine long term effects.

The results from this study do not agree with a previously reviewed study by Graham and Lawson, 6/7/76 (Bioresearch Labs) where no effects were observed on bacterial, actinomycetes, or fungal populations in soil at rates as high as 250 ppm. Microorganisms were not identified to family name or genera, making it difficult to compare this study with the study done by C. D. Ercegovich (2/15/78).

Microbial studies using a functional approach showed a decrease in nitrification at 50 ppm, while cellulolytic activity was enhanced by the addition of 50 ppm CGA-15324. (It should be noted that the cellulose degradation study was unacceptable since cellulose degradation was not followed and microorganism were not identified.)

B) The following recommendations were made to CIBA-GEIGY per phone conversation of 10/16/1978, concerning the resolution of the comments from the review of 5/26/78.

1. A document should be made with new data (control chart, etc) and the companies position as to correlation of population studies vs. functional studies.
2. Submit this to the product manager for consideration by EFB.
3. If we agree then the recommendations from the registration submission can be changed.

C) The following comments are CIBA-GEIGY's response to A&B.

I. Cellulose Decomposition

A. Question: Was a control treatment (0 ppm Curacron) included on the cellulose decomposition study?

Response: As was discussed in "CGA-15324: Update of Environment Impact Statement" (ABR-78023) dated March 3, 1978, treatment levels of 0, 5, 25 and 50 ppm Curacron were employed. For ease in review, the Environmental Impact Statement plus copies of the microbial research reports from Elars Bio-research Laboratories and from Dr. C. D. Ercegovich at Pennsylvania State University are attached. (Please note that these reports were previously submitted to the EPA in our March 3, 1978 application for registration.)

B. Question: Regarding the identity of microorganism in the cellulose decomposition study, was the biomass determined?

Response: The effect of Curacron on microbial cellulose decomposition was studied using a growth medium containing cellulose as the principal carbon source. The growth medium was inoculated with a culture enriched with cellulose decomposers, treated at 0, 5, 25 and 50 ppm Curacron and incubated for 11 days. Following incubation, the mycelium was harvested, oven dried and weighed to determine growth. Thus, fungal mycelium was used as a measure of total biomass. Since this culture was obtained from soil, the increase in fungal biomass demonstrates Curacron does not inhibit cellulose decomposition in soil.

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C. Question: The results of the cellulose study using the functional approach appear to conflict with results of the pure culture studies?

Response: A review of the data demonstrates Curacron displayed a stimulatory effect on cellulolytic activity as measured by the fungal mycelial growth. Curacron did, however, inhibit several fungal species included in the pure culture studies. These data are not intrinsically conflicting since in soil a microbial population shift may occur which would not affect cellulose decomposition.

In addition, it should be emphasized that the lowest level (5 ppm) used in the pure culture studies is much greater than would be present in soil. Curacron is applied postemergence to cotton. Field studies demonstrate more than 90% of the compound is intercepted by cotton and does not reach the soil. Since the maximum usage of Curacron is six applications at a rate of 1 lb. ai/acre, less than 0.6 lbs. ai/acre will reach the soil during a growing season. Leaching plus soil adsorption data indicate Curacron is strongly adsorbed to soil which would lower its availability to the microbial population even farther. Soil metabolism data which indicate Curacron is degraded rapidly to CO₂ and nonextractable residues, further emphasize Curacron's low levels and transient nature in soil.

II. Nitrification

A. Comment: At the 50 ppm treatment level, soil nitrification was inhibited at the 28-day sampling.

Response: In analyzing the data in the Elars Report (the data are shown graphically in the attached Figures I and II), it appears that Curacron had an adverse effect on the nitrification ability of soil at 50 ppm. This was a transient effect in the silt loam soil seen between the 14 and 28 day sampling periods. After the 42-day sampling, there was little difference between the treatments and the control.

In the sandy loam soil, nitrification appears to be inhibited between days 42 and 56. However, as in the silt loam soil, the inhibition was a transient effect and had essentially disappeared by the 70-day sampling.

CIBA-GEIGY concludes that the results of the soil microbial studies, in combination with data demonstrating there would be minimal exposure to soil microbes under field conditions, demonstrate Curacron would not adversely affect soil microbes when used according to label directions.

3.0 Conclusion

Additionally submitted data and comments have satisfied the questions that were addressed to the applicant of 5/26/78.

The effect of Pesticides on Microbes data requirement has been satisfied and can be used to support proposed uses of Curacron where the data is required.

4.0 Recommendations

4.1 P. M. Note

Additional data and comments submitted from CIBA GEIGY's letter of November 7, 1978, is satisfactory to answer the questions addressed in 100-200 of 5/26/78. The Effect of Pesticides on Microbes data requirement has been satisfied and can be used to support proposed uses of Curacron where this data is required.

Ronald E. Ney, Jr. 11/15/78
Robert F. Carsel 11/15/78
Environmental Fate Branch
Review Section One

Robert F. Carsel 11/21/78