Shaughnessy No.: 128701

Date out of EAB: 10 APR 1984

To: R. Mountfort
Product Manager #23
Registration Division (TS-767)

From: Samuel M. Creeger, Chief
Environmental Chemistry Review Section 1
Exposure Assessment Branch
Hazard Evaluation Division (TS-769c)

COPY

Attached, please find the EAB review of:

Reg./File No.: 8340-EUP-I

Chemical: fenoxaprop-ethyl, (Ethyl-2-[4-[(6-chloro-2-benzoxazolyl) oxy]phenoxy]propanoate

Type Product: Herbicide

Product Name: WHIP 0.75 EC Herbicide

Company Name: American Hoechst

Submission Purpose: EUP on rice and soybeans

ZBB Code: other	Action Code: 710
Date In: 2/7/84	EAB No.: 4192
Date Completed: 4/6/84	TAIS (Level II) 52 — Days 7.5

Deferrals To:

________ Ecological Effects Branch

________ Residue Chemistry Branch

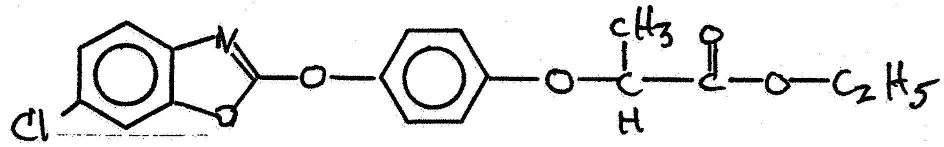
________ Toxicology Branch

1.0 INTRODUCTION

Chemical Name and Type of Pesticide: fenoxaprop-ethyl(proposed common name), ethyl-2-[4-[(6-chloro-2-benzoxazolyl)oxy] phenoxy] propanoate, 12.5% ai, herbicide.

Trade Name: Whip 1 EC Herbicide
HOE-33171

Chemical Structure:



American Hoechst is requesting an Experimental Use Permit (EUP) to use Whip 0.75 EC Herbicide on rice. Briefly, the program consists of 40 studies in 4 states, with each study to be done on 1-5 acre plots. The maximum acreage treated will be 200 at 0.15 lb ai/A for a total of 30 lb ai. Because an EUP to use Whip 1EC and Whip 0.75 EC on soybeans is currently being reviewed by HED, the two EUP's have been combined. The proposed programs for the 0.75 EC formulation use on rice and soybeans are attached.

2.0 DIRECTION FOR USE

See attached labels.

3.0 DISCUSSION OF DATA

3.1 AEROBIC AQUATIC METABOLISM

3.1.1 Hoe 033171 - ^{14}C, aerobic aquatic metabolism in a surface water/sediment system. Tab D-3-1, vol 4, Acc. #072305.

Experimental Procedure

A system consisting of 1-3 Erlenmayer flasks and a carbosorb CO_2 trap (figure 1) was used to test the aerobic aquatic metabolism of soil and water from rice field in Mississippi Research Farm of American Hoechst. The soil/sediment was at pH 6.4 and 1.6% O.M., 7.2% sand, 70.4% silt, and 22.4% clay.

Each flask contained 20 g sediment (dry weight) and 180 ml rice field water giving a water depth of about 2 cm. In addition to moistened air being pumped into the flasks, aeration was also achieved by gentle agitation of the flasks. The test substance was uniformly ^{14}C-labeled in the chlorophenyl ring and when 0.5 mg (dissolved in acetone) was added to the sediment/water corresponded to 2.8 mg/l, if dose contained in water phase. To prevent precipitation, system was stirred vigorously with slow addition of test substance. Radioactive content was measured for: CO_2 trap, water, extract of sediment (acetonitrile/water, 4:1), and extracted sediment. Sampling of batches was at one day (one flask), 6 days (one flask), 14 days (2-flasks), 21 days (3-flasks), and 29 days (3-flasks). Analyses included LSC, TLC, and GC. Figure 2 shows the soil extraction system.

Results

Table 1 summarizes the TLC results. In the water phase, the parent compound (Hoe 033171) was not detected on any of the sampling days, apparently being rapidly converted to the acid (Hoe 053022). In the sediment extract, conversion was slower being somewhere between day 1 and day 6. The table also shows the rapid adsorption of parent to the sediment on day 1.

Figure 4 shows the radioactive distribution in the fractions of the system. The general decrease in water activity is accompanied by a general increase in sediment activity.

Figure 5 shows distribution of parent and degradates. The rapid decrease in the parent and the corresponding increase in the acid can be clearly seen. No half-life value was calculated from this decline curve of the parent compound. Figure 6 shows the CO_2 - evolution from the chlorophenyl ring and indicates mineralization of the heterocyclic moiety. Figure 7 gives the proposed degradation pathway.

Conclusion

Under the experimental conditions of the study, Hoe 033171 degraded rapidly to the acid and ultimately to mineralization (CO_2 evolution) of the chlorophenyl ring.

While no half-life was given for the parent, it was possible to use our linear/log regression analysis program on the approximate percent values in Figure 5 to obtain a half-life of 3.8 days. The statistics of the analysis are attached (Figure 8).

The study satisfies this data requirement and supports an EUP/registration on rice.

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___ Identity of the source of product ingredients

___ Sales or other commercial/financial information

___ A draft product label

___ The product confidential statement of formula

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Figure 8: REGRESSION ANALYSIS OF RESIDUE DECLINE DATA

NAME: HERBERT MANNING DATE: 4/2/84

TITLE: AEROBIC AQUATIC METABOLISM

REMARKS: DISTRIBUTION OF DEGRADATES (percent values of parent from Fig. 5)

FILE NAME: WHIP RESIDUE LEVELS IN % INTERVALS IN DAYS

DATA ENTRIES 1 TO 5
100 at 0 DAYS 5 at 6 DAYS 1 at 21 DAYS
40 at 1 DAYS 7 at 14 DAYS

N= 5 SUM X= 42 SUM X↑2= 674 SUM Y= 11.8494 SUM Y↑2= 41.1923 SUM X*Y= 40.5883
For the 95% confidence level, the appropriate 't' VALUE=2.3465 (For a one tailed test)

DF=3 CORRELATION COEFFICIENT=.908364 CORRELATION COEFFICIENT SQUARED=.825125
Y-INTERCEPT= 3.91145 RELATIVE % ERROR OF THE SLOPE= 26.6% % LOSS PER DAY= 16.77%

SLOPE= -.184, its UPPER 95% CL= -.069 and its LOWER 95% CL= -.298
HALF LIFE= 3.8 DAYS, its UPPER 95% CL= 10 DAYS and its LOWER 95% CL= 2.3 DAYS

DAY ZERO LEVEL=49.971 %, its UPPER 95% CL=575.717 % and its LOWER 95% CL=4.337 %

3.2 FISH ACCUMULATION

3.2.1 Bioaccumulation study with Hoe 33171 OH AT206 (Hoe 33171 active ingredient 95.8%) on Lepomis gibbosus (Pumpkinseed sunfish), Document No. A27824, Tab # D-3-2, Acc. # 072305.

A summary of this study was submitted by the registrant and was included verbatim in a previous review (17 Feb 1984). A review of this nonradiolabeled study is given below.

Experimental Procedure

The fish were kept for more than 14 days in a fish culturing room before the study was started. No disease was apparent and the mortality was less than 1%. Parameters and conditions of the test water were as follows:

- tap water stripped of chlorine was used
- temperature kept at 22 ± 1°C
- pH 7.5 ± 1
- oxygen level above 60% of capacity at 22°C

Test aquaria were kept at a volume of about 36 liters. The flow rate was 200 ml/min, resulting in 8 changes/day. Acetone (max. 0.1 ml/l water) was used to solubilize the active ingredient. A stock solution was prepared and 0.05 ml/min added to water flow giving a tank concentration of 0.033 ppm. Controls consisted of untreated water and solvent. 120 sunfish, each about 3-4 g in weight, were added to each of the test and control aquaria. Five fish were taken for residue analysis on day 1, 3, 7, 10, 14, 21, and 28. The same number were taken during the depuration phase on day 1, 3, 7, 10, 14, and 21.

Quantification of parent (Hoe 33171) and acid degradate (Hoe 53022) in water was done separately by HPLC. Fortified samples gave greater than 95% recovery.

Quantification of residues in fish tissue was done by forming the derivative 6-chloro-2,3-dihydro-benzoxazol-2-one, the ultimate end-product in plants and warm-blooded animals. Analysis was by GC-MS. Recovery was 94%.

Results

Fish mortality in the aquaria was 5.8% in the control group, 6.0% in the solvent control, and 18.3% in the treated group. While mortality in treated groups was higher than controls, it was not attributed to the treatment since the deaths occurred throughout the sampling period and not at one particular time. None of the fish showed signs of toxicity.

Figure 3 shows the concentration of the residues in water. The conversion of the parent to acid is readily seen.

Figure 5 shows the bioaccumulation of the residues in the whole fish. Uptake of the active ingredient was rapid but was not prolonged and began to decline after the maximum was reached on day three (bioconcentration factor of 384). Under depuration conditions, loss of residues was again rapid and about down to concentration in the water by the end of the period (day 29 to day 50).

Conclusion

The results of this nonradiolabeled study indicate early rapid uptake of Hoe 33171 in pumpkinseed sunfish with an equally rapid decline to a plateau-like level. Depuration brought about loss of residues from fish tissues.

The study will support an EUP for use on soybeans and rice, but for registration a radiolabeled study is needed. We understand one was to have commenced February 1984.

Figure 3 CONCENTRATION IN WATER continued
(concentration from the middle of aquaria in mg/l)

ANALYTICALLY DETERMINED CONCENTRATIONS

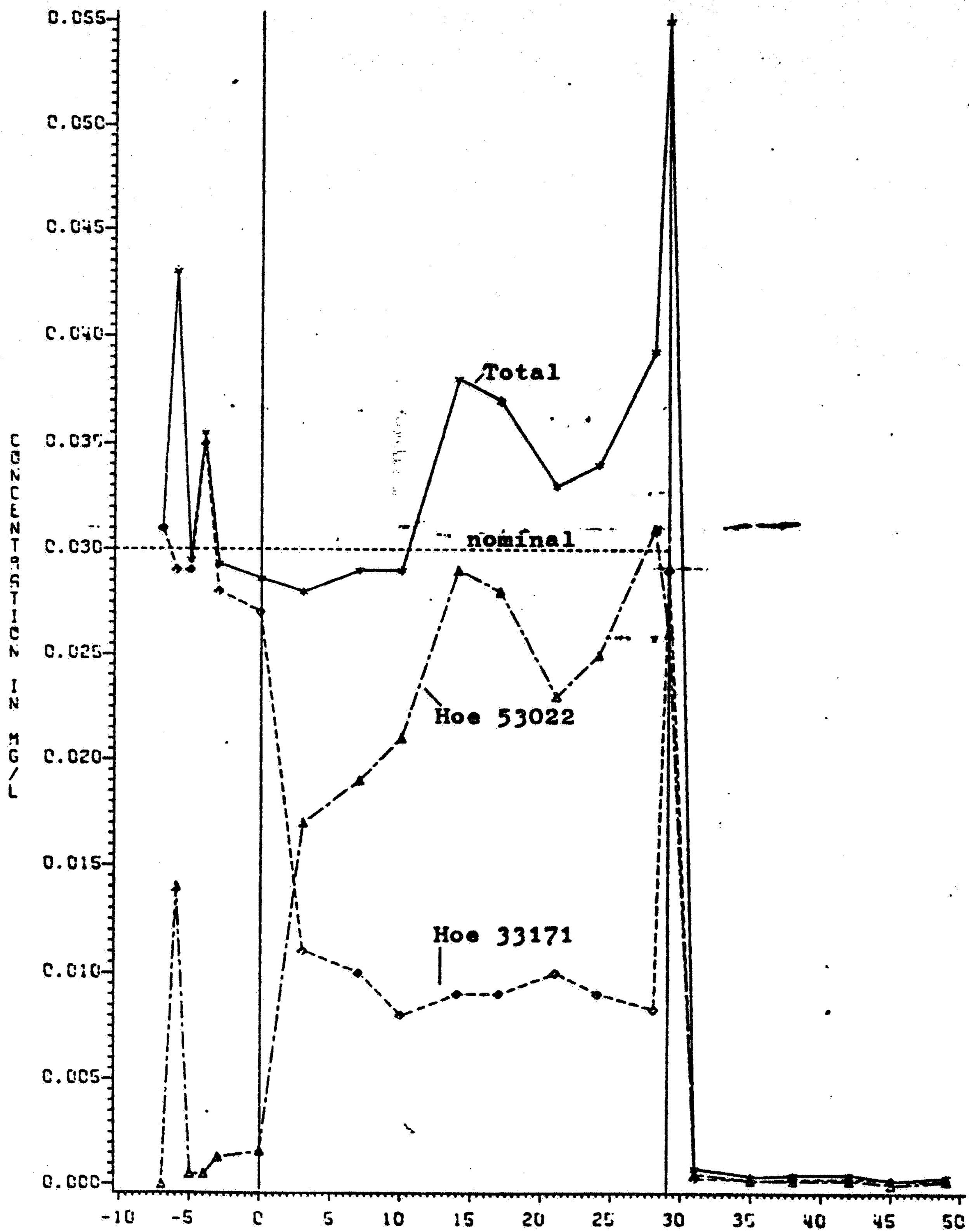
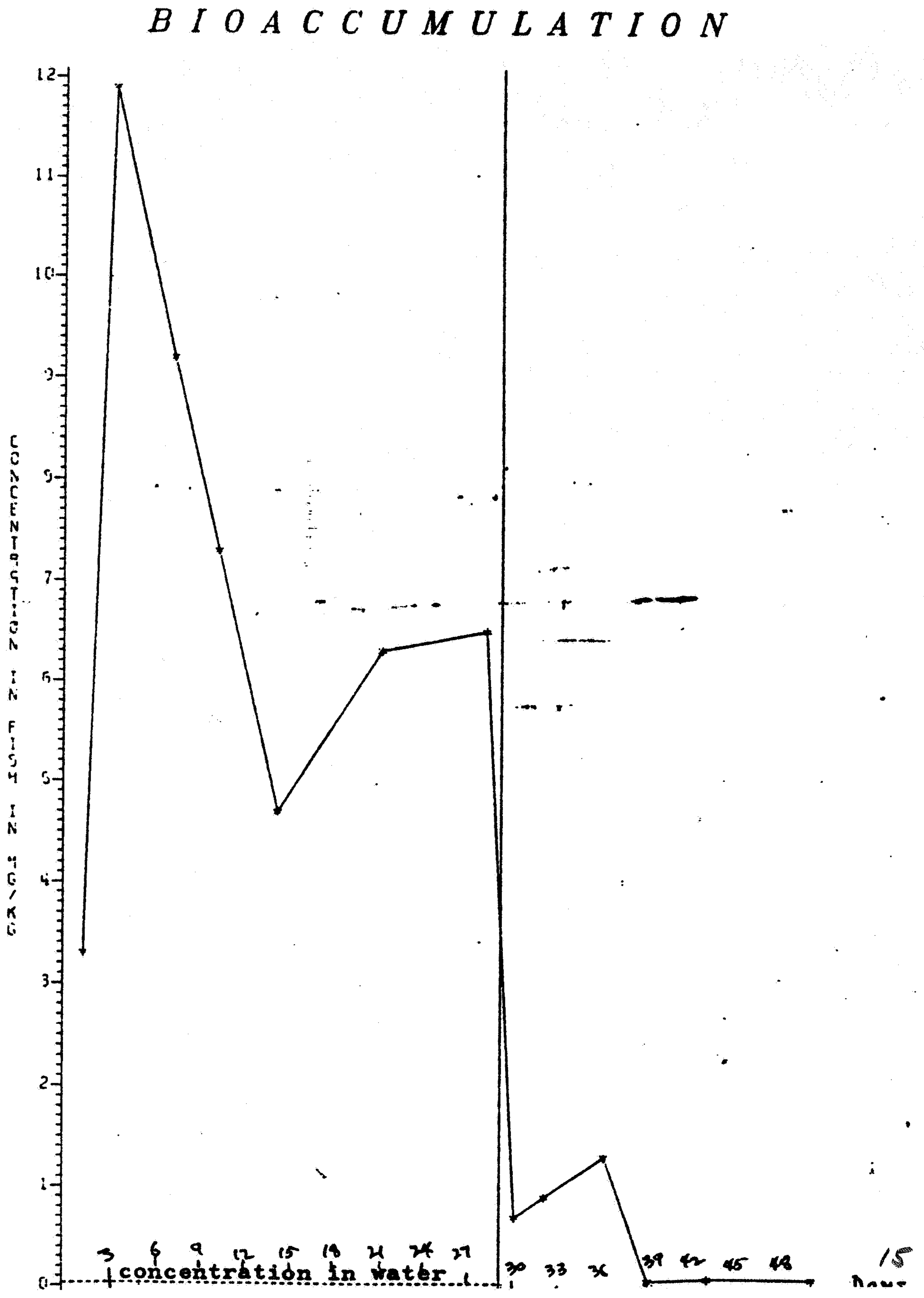


Figure 5 BIOACCUMULATION (residues in the fish tissue in mg/kg)



4.0 EXECUTIVE SUMMARY

In an aerobic aquatic metabolism study, the active ingredient (Hoe 33171) degraded rapidly to the carboxylic acid and to mineralization of the chlorophenyl ring. Pumpkinseed sunfish rapidly reached maximum accumulation by day 3 and declined to plateau level thereafter. Bioaccumulation Factor was 384. Depuration resulted in loss of residues.

5.0 RECOMMENDATION

5.1 EAB has reviewed* and found acceptable the studies required to support an EUP to treat soybeans and rice with Whip 1Ec or 0.75EC Herbicide. The studies are:

- Hydrolysis
- Aerobic Soil Metabolism
- Aerobic Aquatic Metabolism
- Rotational Crop (120 day or one year rotated crop interval)
- Fish Accumulation

5.2 A leaching study (soil TLC) was previously reviewed (3 Nov. 1983) and found acceptable to support registration for use on soybeans. Registration of Whip 0.75 EC on rice, an aquatic food crop, will require a batch equilibrium (adsorption/desorption) leaching study.

5.3 Studies that are presently lacking, and which are required for registration of Whip on soybeans, are as follows:

- Photodegradation - water and soil
- Anaerobic Soil Metabolism
- Soil Field Dissipation

5.4 Similarly, the studies required for registration of Whip on rice are:

- Photodegradation - water
- Anaerobic Aquatic Metabolism
- Leaching (batch equlibrium)
- Water Field Dissipation
- Irrigated Crop (Accumulation)

Herbert L. Manning

Herbert L. Manning, Ph.D.
Review Section #1
EAB/HED

* 3 Nov 1983
4 Jan 1984
17 Feb 1984

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