PROPRIETARY

FILE COPY

Date Out EFB: NOV 24 1980

To: Product Manager 25 Taylor
TS-767

From: Dr. Willa Garner
Chief, Review Section No. 1
Environmental Fate Branch

S M Swaeger (Acting Chief)

Attached please find the environmental fate review of:

Reg./File No.: 7969-EUP-EU

Chemical: BAS-9052-OH

Type Product: Herbicide

Product Name: Poast

Company Name: BASF

Submission Purpose: Request for EUP on soybeans

ZBB Code: Sect 5

ACTION CODE: 705

Date in: 8/25/80

EFB # 582

Date Completed: NOV 24 1980

Time (days) 14

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

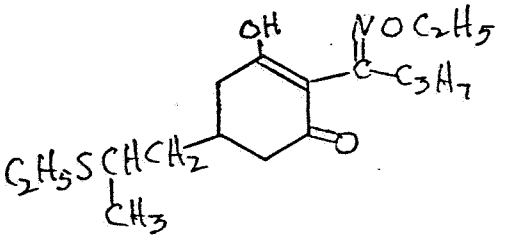
_____ Toxicology Branch

1. Introduction

Chemical Name and Type Pesticide: BAS-9052 OH, 2, [1-(ethoxyimino) butyl]-5-[2-(ethylthio) propyl]-3-hydroxy-2-cyclohexen-1-one, 20% a.i., herbicide.

Trade Name: Poast Herbicide

Structure:



Applicant requests an experimental use permit for a new, post-emergence herbicide to control grasses in soybeans. Studies will be done in 30 states in the midwest, delta, and Atlanta coastal areas, involve 8,000 acres and 2400 pounds of active ingredients. Treated plots will average 4 acres.

2. Directions for Use

See attached sheets.

Sethoxydim environmental fate review

Page _____ is not included in this copy.

Pages 3 through 5 are not included in this copy.

The material not included contains the following type of information:

___ Identity of product inert ingredients

___ Identity of product impurities

___ Description of the product manufacturing process

___ Description of product quality control procedures

___ Identity of the source of product ingredients

___ Sales or other commercial/financial information

✓ A draft product label

___ The product confidential statement of formula

___ Information about a pending registration action

___ FIFRA registration data

___ The document is a duplicate of page(s) _____

___ The document is not responsive to the request

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

3. Discussion of Data

3.1 HYDROLYSIS

Hydrolysis of NP-55; Fine Chemicals Res. Lab.; November 2, 1979; RD-7926, Tab J-1, Acc. #099539.

Experimental Procedure

The hydrolysis of NP-55 was studied in buffered, aqueous solutions (in the dark) for the following temperatures, concentrations, pH values, and times:

25°C	5 ppm	pH 3 - 97 hours
	20 ppm	6 - 35 days
		9 - 35 days
50°C	5 ppm	pH 3 - 7 hours
		6 - 87 hours
		9 - 47 days
	20 ppm	pH 3 - 5 hours
		6 - 87 hours
		9 - 35 days

Analysis was by HSLC, TLC, and mass spectrometry.

Results

NP-55 was hydrolyzed almost exclusively to M2-S, 6-(2-ethylthiopropyl)-4-oxo-2-propyl-4, 5, 6, 7-tetrahydrobenzoxazole. Any other degradate was present in negligible amount.

Half Lives of NP-55 in Aqueous Solution (hours)

pH	25 °C		50 °C	
	5 ppm	20 ppm	5 ppm	20 ppm
3	41.0	38.7	2.6	2.5
6	1123.4	1118.0	64.8	55.9
9	20,091.2	16,742.7	1386.3	2310.5

6

Conclusions

NP-55 is fairly stable to hydrolysis with a half-life of about 47 days (for both 5 and 20 ppm) under environmental-like conditions of pH 6 and 25 °C. The study satisfies this EC data requirement.

3.2 PHOTOLYSIS

Photolysis of NP-55 Under Anaerobic and Aerobic Conditions, Fine Chemicals Res. Lab, 30 May 1980, RD-8053, Tab J-2, Acc. #099539.

This is not a data requirement for an EUP, so it will only be briefly reviewed.

A 5 ppm aqueous solution of NP-55 was irradiated with a mercury lamp under anerobic and aerobic conditions. The half-life of NP-55 was about 23 and 38 minutes under these conditions, respectively. The major photo-products were deethoxylated compound series such as M1-O and M1-SO. Exposure to sunlight gave a half-life of 5.8 hours and the major products were M1-S and M1-O.

3.3 OCTANOL/WATER PARTITION COEFFICIENT

This is not a data requirement for an EUP, so it will only be briefly reviewed.

Octanol/Water Partition Coefficient of NP-55, Fine Chemical Res. Lab, 31 March 1979, Tab J-4, Acc #099539

Using carbon-14-labeled NP-55 and LSC analysis the partition coefficient was 21 to 27. Under similar treatment the value for DDT was about 850.

3.4 AEROBIC SOIL METABOLISM

Investigations into the aerobic soil metabolism of BAS 9052 H/NP 55, R. Huber, BASF Wayandotte Corp., Lab Report #1692, Tab #J-5 Acc #099539

Experimental Procedure

Two soil, a loamy sand (2.6% O.M.) and a loam (0.7% O.M.) treated with about 6 ppm BAS 9052 H-^{14}C, were used to study aerobic soil metabolism (at 22 °C) mineralization, and aged soil leaching. Soil metabolism samples were taken at 0, 1, 2, 5, 7, 14, 21 days, and at 1, 2, and 3 months. Analysis involved methanol and methylene chloride chloride extractions and use of LSC, TLC, HPLC, and GC/MS. Soil mineralization was determined by an apparatus that passed moistened air through the soil and into traps for $^{14}CO_2$ and basic volatiles. The experiment lasted 45 days. Treated loamy sand soil was aged 30 days before packing a 30 cm high column for the leaching experiment. The column consisted of six 5 cm high segments and received 12.5 mm of water daily for 45 days. Analysis was by combustion to $^{14}CO_2$ and then LSC.

Results

The soil metabolism study determined that half-life of the herbicide in loamy sand to be 4-5 days and in loam about 11 days. In loamy sand, total radioactive residues decreased to 54% of applied after 3 months. The loss was mainly due to mineralization to $^{14}CO_2$ (activity 36% of applied after 45 days). In loam soil, aerobic metabolism was slower. In loamy sand, M-SO was the main metabolite, although there were small amounts of M_2-SO_2, and trace amounts of M-SO_2. In loam soil, M-SO was the major degradate with small amounts of M-SO_2. The leaching experiment (aged leaching in loamy sand) showed that some (38.3%) leaching occurred.

Conclusion

The herbicide degrades fairly rapidly in soil; some leaching was shown to occur. The aerobic soil metabolism study satisfies this EC data requirement.

3.5 ROTATIONAL CROP STUDY

3.5.1 Uptake of Aged BAS 9052 H (NP 55) Soil Residues by Rotational Crops, R. Huber, BASF Wyandotte corp., Lab Report #1716, Tab J-6, Acc. #099539.

Experimental Procedure

Treated (3 times normal rate) sandy loam soil (2.6% O.C.) aged 1 and 2 months was used to study residues in rotational crops of summer wheat, carrots, green beans, and head lettuce. The soil was from the aerobic metabolism study that used ^{14}C-labeled herbicide. Crops were grown in pots in a greenhouse at 20 ± 2 °C under natural light. Two samples were taken from each pot at the time of thinning and at harvest. Analysis was by LSC.

Results

Radioactive residues for the 1 and 2-month study periods, respectively were:

summer wheat - grain	0.036, 0.043 ppm
greenbeans-beans + pods	0.02, 0.018
carrots - roots	0.007 0.012
lettuce-leaves, whole plant	0.067 0.054

Conclusion

The residues found in the edible portions of the rotational crops were fairly low, even though aging was for only 1 and 2 months. Four and 12 month aging periods are still being studied.

3.5.2 Root Uptake of NP-55 Related Residues from Soil by Rotational Crops, Fine Chemical Res. Lab. 18 February 1980, RD-8034, Acc. #099539.

Experimental Procedures Treatment was 0.5 kg ai/ha or 0.44 lb ai/A.

Radish and wheat were seeded in sandy loam soil (1.7% O.M., pH 6.3) that was aged 120 days after treatment. The soil contained 0.12 ppm. of the labeled herbicide when seeded and placed in Wagner pots and maintained in a greenhouse. Radishes were harvested after 150 days and separated into leaves and roots. Wheat was harvested after 190 days and separated into grain, husk, straw, and root. Extraction was by methanol and dichloromethane. Analysis was by LSC and TLC.

Results

The concentration of NP-55 in the soil at harvest time was 0.07 ppm. Residues in radish leaves were 0.03 ppm, in roots 0.02 ppm. In wheat: grain contained 0.03, husk 0.15, straw 0.09 and root 0.16 ppm. Analysis of the residues indicated that the husk and straw of the wheat plant contained mainly M1 and M2-type compounds rather than M-type.

Conclusion

The edible parts of radishes and wheat contained low amounts of residues after growing in treated soil aged 120 days. This study satisfies the data requirement for an EUP, but for full registration a longer aging period that would show no detectable residues would be required.

4. Executive Summary and Conclusions

NP-55 is fairly stable to hydrolysis (T 1/2 = 47 days), degrades under exposure to sunlight (T 1/2 = 5.8 hours), and has an octanol/water partition coefficient of 21 to 27. A metabolism study in loam soil gave a half-life of 11 days. Leaching in loamy sand was shown to occur. Residues were low, or undetectable in rotated crops of radishes, wheat, carrots, green beans, and head lettuce.

5. Recommendations

EFB concurs with the use of GAS 9052 H/NP-55 (Poast Herbicide) under the proposed experimental use permit program.

Because there were detectable residues in rotated crops, a 12-month crop rotation restrictions is required.

Herbert L. Manning, Ph,D
Review Section #1
Environmental Fate Branch
Hazard Evaluation Division

SYNONYMS (ACTIVE INGREDIENT):

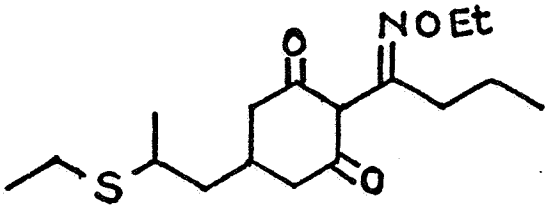
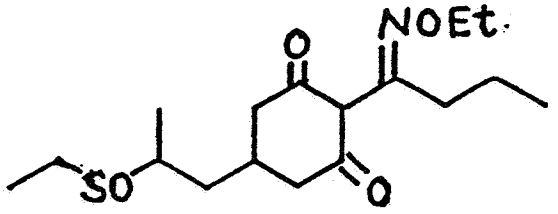
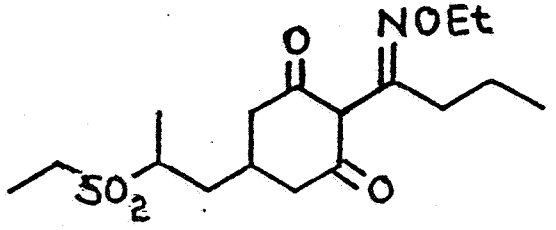
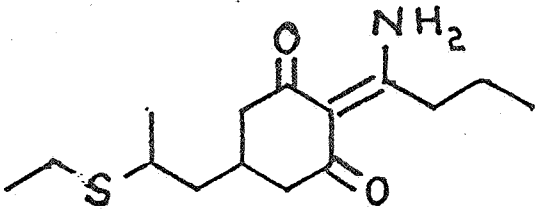
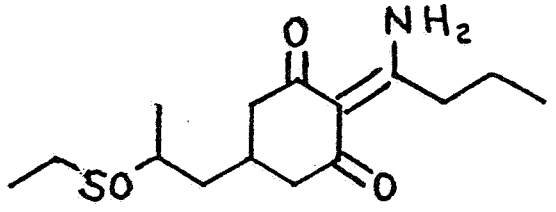
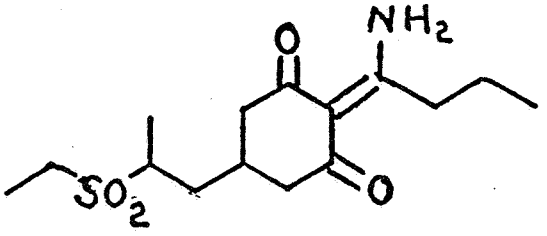
2-(N-ethoxybutyrimidoyl)-5-(2-ethylthiopropyl)
-3-hydroxy-2-cyclohexen-1-one

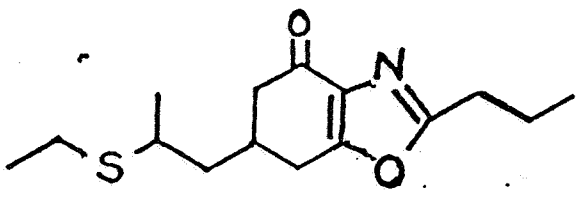
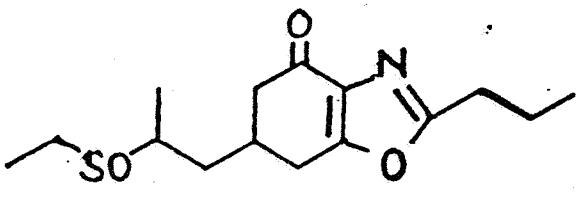
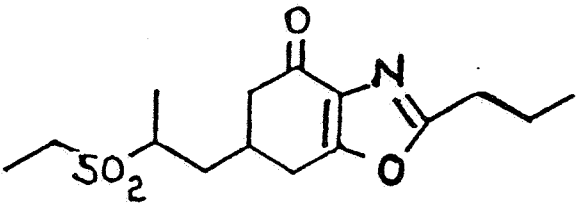
*2[1-ethoxyamino)butylidene]-5-[2-ethylthio)propyl]-
1,3-cyclohexanedione

*BAS 9052 H displays eno-keto tautomerism and this synonym names the keto form. In most of the studies presented in this petition, the enol name and structure are used to represent the tautomer pair.

Poast® is a trademark of BASF AKTIENGESELLSCHAFT, Ludwigshafen am Rhein, Federal Republic of Germany.

Structural Formulae and Abbreviations for BAS 9052 H and Its Derivatives

STRUCTURAL FORMULA	MW	ABBREVIATION
	327	MS or BAS 9052 H
	343	MSO
	359	MSO_2
	283	M1S
	299	M1SO
	315	$M1SO_2$

STRUCTURAL FORMULA	MW	ABBREVIATION
	281	M2S
	297	M2SO
	313	$M2SO_2$