

US EPA ARCHIVE DOCUMENT

128800

Shaughnessy No.: 128850  
Date Out of EAB: 6/28/90

To: Joanne Miller  
Product Manager 23  
Registration Division (H7505C)

From: Henry Nelson, Acting Section Head *H Nelson*  
Environmental Chemistry Review Section #3  
Environmental Fate and Groundwater Branch/EFED (H7507C)

Through: Hank Jacoby, Chief *Hank Jacoby*  
Environmental Fate and Groundwater Branch/EFED (H7507C)

Attached, please find the EAB review of . . .

Reg./File # : 8340-GR  
Chemical Name : Glufosinate ammonium  
Type Product : Herbicide  
Product Name : Ignite  
Company Name : Hoechst Celanese Corporation  
Purpose : submission of EUP request and protocol on non-crop areas

Date Received: 4/9/90 Action Code: 700  
Date Completed: \_\_\_\_\_ EFGWB # (s): 90-0500  
Monitoring Study Requested: \_\_\_\_\_ Total Reviewing time: 3 days  
Monitoring Study Volunteered: \_\_\_\_\_

Deferrals to: \_\_\_\_\_ Ecological Effects Branch  
\_\_\_\_\_ Science Integration and Policy Staff, EFED  
\_\_\_\_\_ Non-Dietary Exposure Branch, HED  
\_\_\_\_\_ Dietary Exposure Branch  
\_\_\_\_\_ Toxicology Branch I, HED  
\_\_\_\_\_ Toxicology Branch II, HED

1. CHEMICAL:

Common name: Glufosinate ammonium

Chemical name:

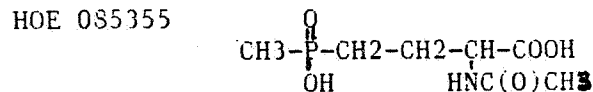
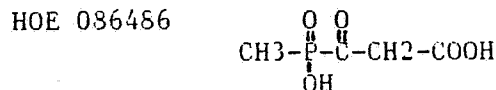
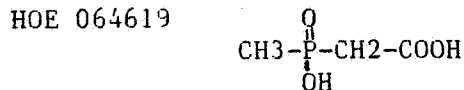
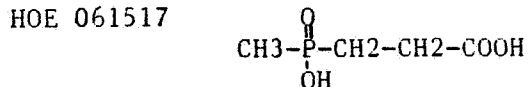
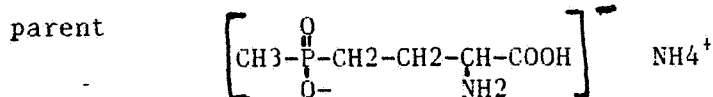
parent -- Monoammonium 2-amino-4-hydroxymethylphosphinyl-butanoate or ammonium-DL-homoalanin-4-yl methylphosphinate.

degradates

3-Methylphosphinico-propionic acid -- HOE 061517  
2-methylphosphinico-acetic acid -- HOE 064619  
3-methyl phosphinico-3-oxo-propionic acid -- HOE 086486  
2-acetamido-4-methylphosphinico-butanonic acid -- HOE 085355

Trade name(s): Ignite; Hoe 039866.

Structures:



Formulations: 1.67 lb ai/gallon (16.22% ai) aqueous soluble.

Physical/Chemical properties:

Molecular formula:  $\text{C}_5\text{H}_{15}\text{N}_2\text{O}_4\text{P}$ . Molecular weight: 198.2  
Melting point: 215 C. Solubility: 1370 g/L  $\pm$  11% at 22 C.  
O/W partition coefficient: <0.1. Physical state: Solid.

2. TEST MATERIAL: described in the attached DER

3. STUDY/ACTION TYPE: submission of request and protocol for EUP on non-crop areas

4. STUDY IDENTIFICATION:

5. REVIEWED BY:

E. Brinson Conerly  
Chemist  
EFGWB/EFED/OPP  
Review Section #2

Signature: E. B. Conerly

Date: 6/20/90

6. APPROVED BY:

Henry Nelson  
Acting Section Head  
EFGWB/EFED/OPP  
Review Section #3

Signature: H Nelson

Date: 6/26/90

7. CONCLUSIONS:

- 1) The data requirements for the issuance of a non-crop terrestrial EUP are essentially fulfilled, except for some information on the soils used in the metabolism studies.
- 2) The available data indicate a compound which is mobile, and also could be moderately persistent under some conditions. Therefore, it has the potential to reach and enter ground or surface water.
- 3) The area to be treated under this EUP is a maximum of 3700 acres in the entire country, and 500 in any one state.
- 4) Since the EUP is for the purpose of collecting efficacy data, no additional data relevant to EFGWB concerns is intended or will result from this EUP.

8. RECOMMENDATIONS:

Information which RD should consider in deciding whether to grant the EUP is summarized in the "Conclusions" section above, and discussed in more detail in "Background" below.

The necessary information to complete the data base should be supplied with all due speed.

9. BACKGROUND:

A comprehensive discussion on the entire body of Glufosinate Ammonium data is currently in secondary review.

The EUP is to take place in 17 states representing the South, Southwest, Northeast, Midatlantic, and Midwest. A maximum of 3700 acres total will be treated, up to a maximum of 500 in any one state. A maximum of 3952 total pounds of active ingredient will be used, up to a maximum of 550 in any one state. The applicant proposes to treat non-crop areas including railroad and highway rights-of-way, ornamental plantings, utility, industrial, and commercial areas. No environmental fate data will result from this EUP. Data required for the approval of the EUP include hydrolysis (fulfilled), aerobic soil metabolism (partially fulfilled), leaching/adsorption/desorption (fulfilled), and accumulation in fish (fulfilled).

Glufosinate ammonium is a nonselective foliage-applied herbicide used to control a broad spectrum of emerged annual and perennial grass and broadleaf weeds on field and vegetable crops, orchards, vineyards, terrestrial nonfood sites (including dry ditches and canals, and ditch banks), domestic outdoor sites, and greenhouses. It will also control or suppress certain woody and herbaceous plant. Glufosinate ammonium is primarily a contact herbicide with limited systemic activity; plants that have not emerged will not be controlled and there is reported to be no residual activity. Glufosinate ammonium is formulated as a 1.67 lb/gallon (16.22%) aqueous soluble, and it may be tank-mixed with numerous other pesticides. There appear to be no tolerances for glufosinate or its primary metabolite as of the 1989 40CFR.

## DATA REQUIREMENTS PENDING FOR FULL REGISTRATION

Additional information is necessary on the following:

soil photolysis -- a NEW STUDY under conditions more nearly approximating actual use rates

soil metabolism -- information needed on MRID # 413231-18 and 19 -- comparisons of experimental soils with US soils -- e.g. Deutschland soil # 2 is similar to soil found in the northeast quadrant of Smalltown, MD, USA

laboratory volatility -- information on the modeling scheme used. Present information does not support granting a waiver.

### field dissipation

Since there is a vineyard use, a field dissipation study is required in this special area.

Due to the as yet undetermined potential for contamination of ground water in highly vulnerable orchard sites such as Florida citrus, a field dissipation study in one of these areas is required.

Further data requirements, such as a ground water monitoring study, may be imposed as a result of these data.

The stated application rate in the most recent study done in Illinois is not confirmed by the soil analyses. Also, the sensitivity of the analytical method in the current studies does not meet the EFGWB recommendation of 0.01 ppm. For these studies to be fully acceptable, the applicant should demonstrate that the method is the best currently available. Also, a sample chromatogram showing separation of the three reference (authentic) compounds is necessary for complete acceptability.

field rotational crop accumulation -- The sensitivity of the analytical method in the current studies is less than the EFGWB recommendation of 0.01 ppm, and for these studies to be fully acceptable, the applicant should demonstrate that the method is the best currently available. Also, a sample chromatogram showing separation of the three reference (authentic) compounds is necessary for complete acceptability.

## ENVIRONMENTAL FATE and DATA BASE ASSESSMENT

- 1) Hydrolysis -- fulfilled -- MRID # 403456-56 -- Glufosinate ammonium has a half life estimated at more than 300 days at pH 5, 7, and 9
- 2) Photodegradation in water -- fulfilled -- MRID # 413231-15 -- Glufosinate ammonium is photolytically stable in sterile aqueous solutions (no degradation after 35 days irradiation).
- 3) Photodegradation on soil -- not fulfilled -- existing studies were not acceptable, and a new study is required. One study does indicate that glufosinate ammonium is subject to light-mediated degradation (half-life 35-36 days) which also requires live microbes. The major degradate identified in another study was 3-methyl phosphonicopropionic acid (HOE 061517).
- 4) Aerobic soil metabolism -- partially fulfilled, requires submission of soil characteristics -- MRID # 403456-59-A, MRID # 413231-19, MRID # 403456-59-B -- Values for half-lives are as follows:

HOE 039866 -- 5 - 30 days in various soils

HOE 064619 -- 20 days in sandy loam

HOE 061517 -- 13 to >120 days in various soils

These half-lives appear to be concentration dependent, with slower rates at higher concentrations

- 5) Anaerobic soil metabolism -- fulfilled -- MRID # 405010-14 and 413231-20 -- half life of 45 - 60 days in silt loam, major degradates are HOE 064619 and HOE 086486.
- 6) Aerobic aquatic metabolism -- fulfilled -- MRID # 403456-60 -- [<sup>14</sup>C]glufosinate degraded with a half-life of 64 days in an aerobic gravel-pit water:sand sediment system. The [registrant-calculated] half-life was 29.1-35.2 days.
- 7) Mobility - Leaching and adsorption/desorption -- fulfilled for parent and two degradates. MRID # 403456-62 showed that unaged glufosinate was mobile to very mobile in various soils. [<sup>14</sup>C]3-methyl phosphinico-propionic acid was very mobile to slightly mobile.

MRID # 413231-21 showed that HOE 064619 was not mobile in a silt loam soil.

- 8) Laboratory volatility studies -- not fulfilled -- a waiver has been requested but not granted (EBC pending). EPCWB will reconsider when further information on the partitioning model is provided. The measured vapor pressure is, as the applicant states, probably a "pseudo" vapor pressure produced by decomposition of the molecule [loss of "ammonium" -- EBC].
- 9) Terrestrial field dissipation studies -- partially fulfilled -- Available data, while not fulfilling Guidelines requirements, indicate that parent material and degradates are not persistent and are not detectable at depths below the surficial 10 cm. MRID # 413231-23, 413231-24, 403456-63, 403456-64, and 403456-65 provide some information. MRID # 413231-26, a "field-confined" rotational crop study also showed no significant soil residues below the upper 5 cm.
- 10) Confined rotational crop accumulation -- not fulfilled -- the submitted studies are not completely acceptable to fulfill guidelines, but do not need to be repeated if the field studies become acceptable. MRID # 405010-16 and supplemental information in MRID # 413231-25 show no evidence of accumulation in the test plants. MRID # 413231-26, done at ca. 1/2 the maximum label rate, showed no evidence of accumulation in spinach, radishes, wheat, and carrots planted 120 days after treatment of soil, except in wheat which contained HOE 061517, up to 20% of the total radioactive residue. Most radioactivity was associated with cellulose or hemicellulose.
- 11) Field rotational crop accumulation -- partially fulfilled -- MRID # 413231-27 (done in IL) and 413231-28 (done in MD) showed that no residues in any material from rotational crops of radishes, lettuce, and wheat planted 91 - 90 - 97 days after treatment of plots. A moderate amount of residue occurred in seeds and straw from the primary crop (soybeans) harvested at maturity. The MD study will be fully acceptable if the analytical method is validated, but provides data at only one experimental site. The IL study appears to have been done at a much lower rate than stated. These data appear to support a minimum replanting interval of 3 months for radishes, lettuce, and wheat.

MRID # 405010-15 and 405010-16 have also been reviewed and ruled unacceptable.

- 12) Accumulation in laboratory fish -- fulfilled -- MRID # 405010-17 showed that residues did not accumulate in bluegill sunfish during 28 days of exposure at 0.1 ppm in a flow-through system. This study was originally rejected due to inappropriately applied technical criteria.

#### GROUND WATER ASSESSMENT

Although in the submitted field studies no residues of parent or metabolites have been detected below the surface 10 cm of soil, they could conceivably reach ground water in the most vulnerable areas, e.g., Florida citrus orchards. Once there, since Glufosinate ammonium is stable to hydrolysis but is soluble and therefore mobile, an available route of disappearance would be dilution/diffusion. Another would be metabolism. Soil metabolism of Glufosinate ammonium typically has a half-life of several weeks or longer. Since ground water microbial activity is typically much lower than that of soil, the rate of metabolism in ground water would be expected to be even slower.

#### SURFACE WATER ASSESSMENT

Due to high solubility, parent and primary degradate could also dissolve and be carried into bodies of surface water by rainfall, irrigation, etc. Since they do not adsorb tightly to most soils the tendency would be for these compounds to remain in solution. Since parent compound is resistant to hydrolysis and photolysis, its primary routes of disappearance would be dilution and relatively slow metabolism. An acceptable aerobic aquatic metabolism study indicated a half-life of ca. two months. The photolytic and hydrolytic behavior of the primary metabolite has not been specifically reported.

Directions for Use: label attached

Application rates vary with the type and maturity of the weeds being controlled.

- 1) On terrestrial food crop sites other than minimum tillage systems, the maximum application for soybeans is 7.0 pints product [1.46 lb a.i.] /A, with no more than 21.6 pints product [4.51 lb a.i.] /A applied to other sites (e.g. vine, nut and orchard crops) in a given year.
- 2) On minimum tillage systems, no more than 7.2 pints product [1.50 lb a.i.] /A/year should be applied.
- 3) On terrestrial nonfood sites, the maximum application is 7.0 pints product [1.46 lb a.i.] /A, with no more than 28 pints product [5.34 lb a.i.] /A applied to any site in a given year.

The label states:

- 1) Do not graze treated soybean or corn forage, or orchard cover crops
- 2) Do not apply through irrigation systems or by means of aerial equipment
- 3) Do not apply within 14 days of nut, apple, or grape harvest
- 4) Do not replant treated areas with cereal grains for at least 120 days following the application of glufosinate ammonium.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES: n.a.

11. COMPLETION OF ONE-LINER: no information added

12. CBI APPENDIX: All data reviewed here are considered "company confidential" by the registrant and must be treated as such.

SECTION G

PROPOSED  
1990 - 1991

EXPERIMENTAL USE PERMIT PROGRAM  
FOR  
Hoe 39866 50 SOLUBLE CONCENTRATE HERBICIDE  
IN  
NON-CROP AREAS

March 19, 1990



RIN 5218-93

EFGWB Reviews of Glufosinate (128850)

Page      is not included in this copy.

Pages 8 through 34 are not included.

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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 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.

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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.

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