

US EPA ARCHIVE DOCUMENT

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Date Out of EAB: JAN 27 1988

To: R. Taylor
Product Manager 25
Registration Division (TS-767)

From: T. Dougherty, Chief
Review Section #1
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)



THRU: Paul F. Schuda, Chief
Exposure Assessment Branch/HED (TS-769C)



Attached, please find the EAB review of...

Req./File # : 524-318, 524-333, 524-339

Chemical Name: Glyphosate

Type Product : Herbicide

Product Name : Roundup, Glifonox, Glycel, Rodeo, Rondo

Company Name : Monsanto Company

Purpose : Addendum to a Standard.

Action Code(s): 660

EAB #(s) : 70727-29

Date Received: 6/8/87

TAIS Code: _____

Date Completed: JAN 27 1988

Monitoring submitted: _____

Total EAB Reviewing Time: 3. days

Monitoring requested: _____

Deferrals to: _____ Ecological Effects Branch
_____ Residue Chemistry Branch
_____ Toxicology Branch

1.

CHEMICAL: Common name:

Glyphosate

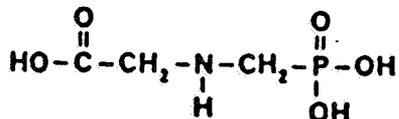
Chemical name:

N-(phosphonomethyl)glycine

Trade name(s):

Roundup, Glifonox, Glycel, Rodeo, Rondo

Structure:



Formulations:

0.42-4 lb ai/gal SC/L, 5-6.6% SC/L, 0.5-1% RTU, and 0.75% PrL.

Physical/Chemical properties:

Molecular formula: C₃H₈O₄NP.

2. TEST MATERIAL:

See individual studies.

3. STUDY/ACTION TYPE:

Addendum to a Standard.

4. STUDY IDENTIFICATION:

The following studies were reviewed as new submittals:

fact ✓ Allan, J.M., A.J. Klein, and W.M. Hamman. 1983. Roundup herbicide dissipation in cool climate forest soil and leaf litter. Report No. MSL-2950; Job/ Project No. 7163. Prepared and submitted by Monsanto Agriculture Company, St. Louis, MO.

✓ Danhous, R.G. 1983. Dissipation of glyphosate in U.S. field soil following direct application of Roundup herbicide. Report No. MSL-3210/MSL-5901. Unpublished study prepared and submitted by Monsanto Company, St. Louis, MO.

✓ Danhous, R.G. 1984. Dissipation of glyphosate in U.S. field soils following multiple applications of Roundup herbicide. Report No. MSL-3352. Project No. 7163. Prepared and submitted by Monsanto Company, Washington, D.C.

The following were submitted as protocols:

Cowell J. E., Roundup Forestry Dissipation Study, Monsanto Agricultural Company, Protocol No. 87-63-R-8, 11-8-86.

Cowell J. E., Rodeo/Water Sprinkler Irrigated Crops Study, Monsanto Agricultural Company, Protocol No. 87-63-R-6, 12-10-86.

Cowell, J. E., Glyphosate Aquatic Dissipation Study, Monsanto Agricultural Company, Protocol No. 87-63-R-7, 12-11-86.

5. REVIEWED BY:

S. Simko
Chemist
EAB/HED/OPP

Signature: S. Simko
Date: 1-22-88

6. APPROVED BY:

T. Dougherty
Chief, Section 1
EAB/HED/OPP

Signature: T. Dougherty
Date: JAN 25 1988

7. CONCLUSIONS:

Three protocols were submitted for aquatic dissipation, forestry and irrigated crops. The analytical methods were not included and so a complete assessment cannot be made at this time. Parent compound and the major degradates need to be analyzed. Also, information noted under Reporting and Evaluation of Data, 164-2/164-3/165-3 and 160-5 should be included. The soil and sediment sampling/compositing protocol, and sample storage conditions should be included for each study. Samples should be taken to a sufficient depth to adequately define the extent of leaching. For the aquatic dissipation study, a site representative of a typical rice growing area should be included. In the irrigated crop study the sampling of soil at harvest of irrigated crops is not addressed and the referenced field data sheets were not included. In the forestry study, the Instructions for Field Residue Plots (RES-86-GSOP-071-0) were not included.

Glyphosate at 2, 4, or 8 lb ai/A, dissipated from the upper 6 inches of clay loam, sandy loam, sandy clay loam, loamy sand, loam, silt loam, and silty clay loam soils with a half-life of less than 64 days. In sandy loam soil, the half-life of glyphosate was 194 to 301 days after the application of Roundup at 4 lb ai/A. At all sites by 1 year post-treatment, glyphosate declined in the 0- to 6-inch soil depth from 0.25-3.68 ppm to less than 0.05 ppm at the 2 lb ai/A rate, 0.11-2.3 ppm to less than 0.05-0.2 ppm at the 4 lb ai/A rate, and 0.52-12.6 ppm to less than 0.05-0.19 ppm at the 8 lb ai/A rate. Maximum concentrations of the primary degradate, aminomethylphosphonic acid (AMPA) were 0.39, 0.58, and 3.07 ppm at the 2, 4, and 8 lb ai/A rates, respectively.

Glyphosate at 1.7 and 3.4 kg/ha, dissipated with a half-life of less than 15 days in leaf litter and in the 0 to 6-cm depth of exposed (nonlitter covered) soil. At 344 days posttreatment, up to 3.2% of the applied glyphosate remained undegraded in the litter and about 10% remained undegraded in the soil. In the 7- to 12-cm soil depth, glyphosate ranged from less than 0.05 ppm (detection limit) to 2.73 ppm and was independent of treatment rate. Aminomethylphosphonic acid (AMPA) was less than 1.17 ppm in the 0- to 6-cm depth of exposed soil and less than 0.05-2.06 ppm in the litter treated at 1.7 kg/ha, and less than 2.34 ppm in the soil and 0.36-6.79 in the litter treated at 3.4 kg/ha; maximum AMPA concentrations in the soil were measured on day 344 (final sampling interval).

8.

RECOMMENDATIONS:

The following data are required:
Photodegradation studies in water

Photodegradation studies on soil

Aerobic soil metabolism studies

Anaerobic soil metabolism studies

Aerobic aquatic metabolism studies

Anaerobic aquatic metabolism studies

Laboratory volatility studies

Terrestrial field dissipation studies: Two studies were reviewed for this addendum. One study (Danhous, 264343) is unacceptable because either the data were too variable to accurately assess the dissipation of glyphosate in soil, or else the sampling intervals were inadequate to establish the half-life of the test substance. This study does not fulfill data requirements because the test substance was not characterized, the pattern of formation and decline of degradates was not addressed in the orchard soil study, soil characteristics including textural analysis were not reported, field test data were not reported, and storage stability data were not reported. Portions of the other study (Danhous, 264332) were unacceptable because the data were too variable to accurately assess the dissipation of glyphosate in soil, insufficient material was present at any sampling interval to establish a residue decline curve, and sampling intervals were inadequate. Portions of this study were scientifically sound but do not fulfill data requirements because the test substance was not completely characterized, the test soils were not completely characterized, field test data were not provided, no pretreatment samples were taken, and no immediate posttreatment samples were taken at the IN and OH sites.

Aquatic field dissipation studies

Forestry dissipation studies: One study (Allan et al., 264343) was reviewed and is scientifically sound. This study does not fulfill data requirements because dissipation of glyphosate in the forest canopy, understory, lakes, and streams was not addressed; the soil was not completely characterized; the test substance was not completely characterized; the treated soil and litter were not sampled deep enough to define the extent of leaching; and meteorological data were not provided.

Confined accumulation in rotational crops

Accumulation studies on irrigated crops

Laboratory studies of pesticide accumulation in fish

The following data requirements are fulfilled:

Hydrolysis studies

Leaching and adsorption/desorption

The following data requirements are deferred or are not required for presently registered uses:

Photodegradation in air: Deferred pending the results of the volatility study.

Field volatility studies

Long-term field dissipation studies

Field accumulation studies on rotational crops

Field accumulation studies on aquatic nontarget organisms

9. BACKGROUND:

A. Introduction

B. Directions for Use

Glyphosate isopropylamine salt is a nonselective, postemergence systemic herbicide registered for use on a variety of terrestrial food crop (field, vegetable, and orchard crops), aquatic food crop (rice), greenhouse, terrestrial nonfood, aquatic nonfood, domestic outdoor, and forestry sites. Application rates range from 0.19 to 3.75 lb ai/A. Glyphosate may be formulated with alachlor or acifluorfen. Single active ingredient formulations consist of 0.42, 3, and 4 lb ai/gal, and 5 and 6.6% SC/L; 0.5, 0.96, and 1% RIU; and 0.75% PrL. Glyphosate may be applied foliarly, in a broadcast,

using conventional ground equipment, hand-held and recirculating sprayers, and aerially. Applicators need not be certified or under the direct supervision of applicators certified to apply glyphosate.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:
See attached reviews of individual studies.
11. COMPLETION OF ONE-LINER:
12. CBI APPENDIX: Data submitted considered company confidential.