Shaughnessy No.: 128501

Date Out of EAB: JAN 21 1986

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

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

Attached, please find the EAB review of...

Reg./File #: 476-EEEL and -EEEA

Chemical Name: sulfosate

Type Product: herbicide

Product Name: SC-0224 Concentrate and SC-0224 4 LC

Company Name: Stauffer Chemical Co.

Submission Purpose: Submission of additional data to support registration on non-crop areas (terrestrial nonfood, domestic outdoor and forestry)

Date Received: 12/19/85

Action Code(s): 121

Date Completed: JAN 21 1986

EAB #(s) : 6147 and 6148

days: 3.5

Deferrals to:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

Monitoring study requested by EAB: ☐

Monitoring study voluntarily conducted by registrant: ☐

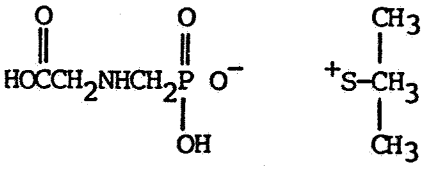
1. CHEMICAL:

Common name: sulfosate

Company codes: SC-0224; R-50224

Chemical name: trimethylsulfonium carboxymethylaminomethylphosphonate

Chemical structure:



$$\mathrm{HO\overset{\overset{O}{\|}}{C}CH_2NHCH_2\underset{\underset{OH}{|}}{\overset{\overset{O}{\|}}{P}}O^- \qquad {}^+\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{S}}\!-\!CH_3}$$

Physical/Chemical properties for technical grade of the active ingredient, unless specified otherwise (obtained from previous submissions):

Physical state: liquid

Color: brown

Odor: faint, characteristic of sulfur-containing compounds

Boiling point: 110°C at 760 Torr

Density: 1.27 g/cc

Vapor Pressure [redacted]

8.2 Torr at 10°C
14.6 Torr at 20°C
24.9 Torr at 30°C
41.3 Torr at 40°C

Vapor Pressure of the active ingredient: $\leq 4 \times 10^{-7}$ torr at 25°C

pH: 3.5-5.0 (1 g in 20 ml water)

Viscosity: 38.2 centistokes at 25°C

Molar Water Solubility (pure active ingredient): 17.6×10^{6} g

Kow (pure active ingredient): <<10 [no sulfosate (<0.1 ppm) in the octanol phase]

INERT INGREDIENT INFORMATION IS NOT INCLUDED

2. TEST MATERIAL:

Soil photolysis study: 57.04% technical [redacted]

Field dissipation studies: 4 lb/gal LC formulation

3. STUDY/ACTION TYPE:

Stauffer Chemical Co. is seeking new registration of SC-0224 Concentrate and SC-0224 4 LC formulations of sulfosate for weed control in non-crop areas (terrestrial nonfood, domestic outdoor, and forestry [forest planting] uses).

4. STUDY IDENTIFICATION:

Hydrolysis and Aqueous Photolysis: Myers, H.W., K.S. Lee, G.G. Patchett and D.B.Katague. 1983. Hydrolysis and photolysis degradation studies of SC-0224. Report No. WRC 83-53. (Unpublished study submitted by Stauffer Chemical Co., Accession no. 258400)

Soil Photolysis: Stauffer Chemical Co. 1983. The photodegradation of SC-0224 applied to soil. (Unpublished study; Accession no. 258400)

Field Dissipation: Stauffer Chemical Co. 1984. Appendixes 3, 4, and 5 in Volume 3 of 3: Applications for conditional registration of SC-0224 4 LC --Supplemental toxicology and environmental fate data. (Unpublished study; Accession no. 258400)

5. REVIEWED BY:

Debra Edwards, Ph.D.
Review Section 1/EAB/HED/OPP

Debra Edwards
JAN 21 1986

6. APPROVED BY:

Samuel M. Creeger, Chief
Supervisory Chemist
Review Section 1/EAB/HED/OPP

Saml M Creeger
JAN 21 1986

7. CONCLUSIONS:

Environmental fate data requirements to support terrestrial non-food, forestry, and domestic outdoor uses of sulfosate are summarized in the table below:

	Terrestrial Non-food	Domestic Outdoor	Forestry
Hydrolysis	R[a]	R	R
Aqueous Photolysis	R	-	R
Soil Photolysis	-	-	R
Aerobic Soil Metabolism	R	R	R
Anaerobic Aquatic Metabolism	-	-	R
Leaching and Adsorption/-Desorption	R	R	R
Field Dissipation	R	R	-
Dissipation for Forestry Use	-	-	R
Fish Accumulation	CR[b]	-	CR
Accumulation in Non-target Aquatic Organisms	-	-	CR

[a] Required.
[b] Conditionally Required.

The present status of each data requirement is summarized below:

Hydrolysis:

The hydrolysis data requirement was satified in a previous submission (see review of 3/1/84). Hydrolysis of sulfosate was determined to be essentially nonexistent at pH 5-9.

Aqueous photolysis:

The aqueous photolysis data requirement was satisfied in a previous submission (see review of 3/1/84). The N-(phosphonomethyl)glycine (PMG) anion had halflives of 14.6, 77.9 and 41.6 days at pH 5, 7 and 9, respectively. Photoproducts were phosphoric acid and aminomethylphosphonic acid. The trimethylsulfonium (TMS) cation was stable at pH 5 and 7, but degraded with a half-life of 31.7 days at pH 9.

Soil mobility:

A previously-submitted TLC study (see review dated 1/17/86) indicated low mobility of the parent compound in soil. However, the study only partially satisfied the leaching and adsorption/desorption data requirements because the mobility of residues obtained from soil aged aerobically with the parent was not tested. Thus, the mobility of degradates, such as aminomethylphosphonic acid (see below — field dissipation), could not be determined. An aged leaching study is needed where the aging period is for one half-life or 30 days, whichever is shorter.

Field dissipation:

The submitted studies, conducted in California, Iowa, and Florida, revealed the presence of significant residues of the anion, the cation, and the degradate, AMPA, in both the 0-3" and 3-6" depth soil samples. Half-life values for the anion were 23.2-25.8 days and for the cation were 29.6-50.4 days. AMPA $t_{1/2}$ values were 91.6 days (CA), and 82.8 days (IA). [AMPA residues in the FL study increased throughout the sampling period.] The studies do not satisfy environmental fate requirements for field dissipation, however, because: (i) samples were taken to an insufficient depth to determine the potential for leaching into groundwater; (ii) no information regarding analytical procedures was submitted; (iii) rainfall and irrigation data were incomplete; (iv) no storage stability data were submitted (samples stored, presumably frozen, for up to 1 year); and (v) no acceptable aerobic soil metabolism study is available to determine whether AMPA is the sole soil degradate for which analysis is required. A previously-submitted 2-month study (accession no. 250548), conducted in Virginia, indicated no potential for leaching below 3" into the soil profile. However, insufficient experimental detail was submitted to determine the validity of the study (refer to review dated 1/17/86).

Soil photolysis:

The submitted study indicates that (i) the anion degrades to AMPA when exposed to sunlight on the soil surface with a $t_{1/2}$ value of 382 hours, and (ii) the cation (TMS) is stable. However, the following data and information must be submitted to permit a final determination of the study's validity: (i) method validation data (accuracy, precision, etc.); (ii) data indicating the stability of residues of CMAMP (anion), TMS (cation), and AMPA in frozen storage; and (iii) data indicating whether any dimethylsulfide was formed in the soil during the illumination period (i.e., prior to the dealkylation step during analysis for TMS).

Aerobic soil metabolism:

Two previously-submitted soil metabolism studies were reviewed (3/1/84) and found unacceptable.

Anaerobic aquatic metabolism:

No data submitted.

Dissipation data for forestry use:

No data submitted.

Fish accumulation:

This data requirement has been waived for the active ingredient (see review of 3/1/84), based on sulfosate's high water solubility and low Kow. However, depending on the water solubilities, Kow values, and relative persistence of degradates determined in the required aerobic soil metabolism study, data may be required to determine the potential for accumulation of degradate residues in fish.

Aquatic non-target organism field accumulation:

This data requirement is waived, with the same qualifications regarding degradates as the fish accumulation study.

8. RECOMMENDATIONS:

The registrant must submit the following information:

a. An aged leaching study in which the test substance is aged for one half-life or 30 days, whichever is shorter, prior to use or consists of the parent and all major degradates found in the required aerobic soil metabolism study.

b. Experimental details of the previously-submitted field dissipation study (see review dated 1/17/86) and an additional field dissipation study conducted in a relatively sandy soil (see section 10.3 E for details). Since three different use patterns are involved, additional use sites will probably be needed. The registrant should consult with the Agency before initiating new field studies. Forest dissipation studies will be needed for the forest use.

c. Experimental details of the submitted soil photolysis study (see section 10.2 E for details).

d. An aerobic soil metabolism study.

e. An anaerobic aquatic metabolism study.

In addition, fish accumulation and aquatic non-target organism field accumulation data may be required for degradates found in the aerobic soil metabolism study, unless the registrant provides evidence that the degradate will not reach water, will not persist in water, or has a relatively low potential for accumulation in fish, indicated by Kow and water solubility. If a fish accumulation study is conducted but reveals no potential for accumulation of residues, the aquatic non-target organism field accumulation data requirement may be waived. The registrant is encouraged to submit test protocol for our comments before initiating any studies.

9. BACKGROUND:

A. Introduction:

Stauffer Chemical Co. is submitting environmental fate data for the new herbicide, sulfosate, as part of a request for registration of SC-0224 Concentrate and SC-0224 4 LC formulations for weed control in noncrop areas (terrestrial nonfood, domestic outdoor, and forest planting sites). These data were originally submitted to Mr. Phillip Gray, Executive Secretary of the Science Advisory Panel, in June, 1985 and were forwarded to RD in November, 1985.

B. Directions for use:

A 52.2% concentrate formulation of the herbicide, sulfosate, is to be applied postemergent at 0.44-4.1 lb ai/A to control actively growing weeds. Spray, wiper, and hand-directed spot applications are proposed. For spray applications, the product is to be mixed with surfactant (2:1) and applied in 10-30 gal. water/A or in 1-2 gal./A if applied by Controlled Droplet Application equipment. For wiper application, two parts product are to be mixed with one part surfactant and six parts water. For hand-directed spot application, two parts of a 1-3% solution of the product in water are to be mixed with one part surfactant.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

10.1 A. Study Identification: Hydrolysis and aqueous photolysis.

Myers, H.W., K.S. Lee, G.G. Patchett and D.B.Katague. 1983. Hydrolysis and photolysis degradation studies of SC-0224. Report No. WRC 83-53. (Unpublished study submitted by Stauffer Chemical Co., Accession no. 258400)

[The submitted hydrolysis and aqueous photolysis studies were previously reviewed in connection with an EUP request and found to be acceptable (see review of 3/1/84).]

10.2 A. Study Identification: Soil photolysis.

Stauffer Chemical Co. 1983. The photodegradation of SC-0224 applied to soil. (Accession no. 258400)

B. Test Materials and Methods:

Technical sulfosate (57.04% ai [redacted] was used to prepare a solution of 2.61 x 10^{-2} g sulfosate/100 ml water. One ml of the solution was sprayed onto each thin layer of soil in Pyrex petri plates (5 g soil/-

plate), resulting in a concentration of 30 ppm. The soil was a loamy sand (refer to Attachment 1 for soil characteristics) which was sieved to 500 microns, spread onto the plate in 3.0-3.5 ml deionized water, and air-dried overnight prior to treatment. Zero time samples were frozen immediatly after treatment and the remaining plates were set on a counter, covered with a box, and allowed to partially dry overnight. Samples were then set on a bench in an outdoor area exposed to sunlight (illuminated samples uncovered; dark controls loosely wrapped in aluminum foil). Samples were exposed 8 hours/day for 24 days (i.e., 192 hours of illumination). Each evening, all samples were covered and frozen until the following exposure day. Temperature and sunlight intensity data were collected throughout the experiment (Attachment 2). The study was most likely conducted in Mountain View, California (location of Stauffer's Pesticide Metabolism Section) in late spring or early summer. [The cover sheet of the report lists a study initiation date of 5/1/83 and a completion date of 8/8/83. Thus, the 24-day exposure period most likely occurred in May or early June followed by analyses and preparation of the report.]

Since the carboxymethylaminomethylphosphonate anion (CMAMP) and trimethylsulfonium cation (TMS) were analyzed separately, samples were taken in quadruplicate so that duplicate analyses could be made for each analysis. The anion and it's metabolite, aminomethylphosphonic acid (AMPA), were extracted with 0.5 M NH_4OH, filtered, concentrated to dryness and derivatized with 9-fluorenylmethyl chloroformate. Analysis was by HPLC using a strong anion exchange column and variable wavelength fluorescence detector (limits of detection: CMAMP = 0.01 ppm; AMPA = 0.1 ppm). The cation was extracted with water and treated with 20% sucrose and 3.6% aqueous NaOH at 100°C to form dimethylsulfide (DMS) via dealkylation. DMS was trapped in toluene, analyzed by GC using a column packed with 3% OV-1 on 80/100 mesh Chromosorb W-HP and detected by flame photometry in a sulfur-specific mode (limit of detection = 0.2 ppm).

C. Reported Results:

The data are presented in Attachment 3. Phototransformation of the CMAMP anion occurred in two phases — an initial fast phase (up to 60 hours) followed by a much slower phase (60-192 hours). Linear regression analyses of the 0-48 hour and 96-192 hour data resulted in a predicted $t_{1/2}$ of 382 hours (illumination; i.e., approximately 48 days of 8 hour/day sunlight). Simultaneous solution and plotting of the two regression equations resulted in a break point between fast and slow degradation rates at 60 hours of illumination (see Attachment 4). The 382 hour $t_{1/2}$ was calculated by subtraction of the 34% CMAMP lost during the fast phase followed by extrapolation of the slow phase to determine when an additional 16% would be lost. Calculated half-lives using only the fast phase and slow phase equations, respectively, were 92.6 and 1000 hours. The theoretical concentration of AMPA that could form was used to calculate the percent AMPA found. AMPA formation mirrored CMAMP loss (see Attachment 4). The sums of recovered CMAMP and AMPA were equivalent to 80-97% of the total applied CMAMP. Recovery of CMAMP from the dark controls gradually declined over time to 84% of that initially applied, but with no corresponding formation of AMPA.

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TMS cation recoveries were 55-69%, except in two samples collected at 96 and 144 hours in which duplicates were not analyzed (see Attachment 3). Recoveries from dark controls and illuminated samples were similar (see Attachment 5) with no apparent overall decrease in concentration. Recoveries from zero time samples were 64-70% and from soil fortified just prior to analysis were 62.5-72%.

D. Study Author's Conclusions:

" . . . the CMAMP anion is photolyzed to AMPA . . . Approximately 34% of the anion photodegrades within 60 h (fast phase), followed by a slow phase resulting in photolysis of another 6% over the next 132 h (192 h total) of illumination."

" . . . an initial fast rate of photodegradation . . . may be due to degradation of the compound on the surface of soil particles while the slow phase may be due to degradation of the compound protected by adsorption on or absorption into soil particles."

"No photodegradation of the trimethylsulfonium (TMS) cation occurred, although there was an instantaneous loss of about 35% of the total TMS applied to the soil, probably due to chemical hydrolysis."

E. Reviewer's Discussion and Interpretation of Results:

The data indicate that (i) CMAMP photodegrades to AMPA on the soil surface with a half-life (generated using both initial fast and subsequent slow phase photodegradation) of 382 hours of sunlight, and (ii) TMS is stable to photolysis in soil. However, the absence of the following information and data preclude a final determination as to the validity of the submitted study.

a) Method validation data (accuracy, precision, etc.).

b) Data indicating the stability of residues of CMAMP, AMPA, and TMS in frozen storage.

c) Data indicating whether or not any dimethylsulfide was formed in the soil during the illumination period (i.e., prior to the dealkylation step during analysis for TMS).

These data and information must be submitted.

10.3 A. Study Identification: Field dissipation.

Stauffer Chemical Co. 1984. Appendixes 3, 4, and 5 in Volume 3 of 3: Applications for conditional registration of SC-0224 concentrate and SC-0224 4-LC -- Supplemental toxicology and environmental fate data. (Unpublished study; Accession no. 258400)

B. Test Materials and Methods:

Three studies were conducted. In the first study, conducted in Orange Cove, California, a 4 LC formulation of sulfosate was applied to two field plots on 4/27/83 at 6 lb ai/A. A postemergent surface application to weeds was made using a tractor-mounted side boom sprayer. The soil was a sandy loam (2.2% organic matter, pH 6.9) and the air temperature was 78°F. Plots were sampled immediatly after treatment and after 7, 14, 28, 61 and 91 days. Twenty 1 x 6" soil cores were collected, separated into 0-3 and 3-6 inch segments and frozen. Samples were extracted after 256-356 days and analyzed 1-10 days later.

In the second study, conducted in Lisbon, Iowa, a 4 LC formulation of sulfosate was applied to two field plots on 5/26/83 at 6 lb ai/A. A postemergent surface application was made using a tractor-mounted sprayer. The soil was a silty clay loam (6% organic matter). In the first week following treatment, 0.55 inches of rain were recorded. Plots were sampled 2 days before treatment, immediatly after treatment, and 7, 14, 28, 63, 84, and 189 days after treatment. Fifteen 1 x 6" soil cores were collected, separated into 0-3 and 3-6 inch segments, composited, and frozen. Samples were extracted after 117-311 days and analyzed 1 day later.

In the third study, conducted in Sanford, Florida, a 4 LC formulation of sulfosate was applied to three field plots on 4/11/83 at 6 lb ai/A. A postemergent surface application to Bahiagrass was made using a spray boom. The soil was a St. Johns fine sand (0.5% organic matter, pH 5.4) and the air temperature was 79°F. Plots were sampled immediatly after treatment and after 7, 14, 30, 60, 90, and 180 days. Six 1-6" soil cores were collected. Prior to analysis, cores were divided into 0-3 and 3-6 inch segments. Samples were extracted after 177-362 days and analyzed 1-11 days later.

No information regarding analytical method procedures was provided. However, the following recoveries and limits of detection were reported.

Test Location	Fortification (ppm)	Recovery (%)	Limit of Detection (ppm)
		ANION	
CA	0.5/0.2	96/90	0.05
IA	0.228/0.57	61-73/82.4	0.05
FL	0.59/0.234	100/111	0.05
		AMPA	
CA	0.5/0.2	92/89	0.05
IA	0.228	79-98	0.05
FL	0.585/0.234	83/88	0.15
		CATION	
CA	1/0.1	84/83	0.05
IA	0.057/0.57	74/102	0.05
FL	0.117/0.585	96/115	0.05

C. Reported Results:

Raw data and $t_{1/2}$ values (calculated by the registrant using linear regression) are presented in the following tables.

CALIFORNIA

Time Interval (days)	Anion (ppm)		AMPA (ppm)		Cation (ppm)	
	0-3"	3-6"	0-3"	3-6"	0-3"	3-6"
0	15.7	<0.05	4.5	<0.05	8.20	<0.05
7	6.5	<0.05	2.27	<0.05	4.45	<0.05
14	5.6	<0.05	1.98	<0.05	3.15	<0.05
28	1.35	<0.05	1.38	0.11	2.78	<0.05
61	0.48	0.81	0.46	0.44	1.64	0.26
91	0.20	0.77	0.28	1.88	1.18	0.66

IOWA

Time Interval (days)	Anion (ppm)		AMPA (ppm)		Cation (ppm)	
	0-3"	3-6"	0-3"	3-6"	0-3"	3-6"
0	0.92	0.16	0.38	0.10	1.2	0.21
7	1.8	<0.05	1.48	<0.05	0.96	0.15
14	0.86	0.05	1.33	0.08	0.80	0.17
28	1.29	<0.05	2.77	<0.05	0.75	<0.05
63	0.19	<0.05	1.13	0.09	0.22	0.15
84	<0.05	<0.05	0.62	0.07	<0.15	<0.15
189	<0.05	<0.05	0.19	<0.05	0.19	0.19

FLORIDA

Time Interval (days)	Anion (ppm)		AMPA (ppm)		Cation (ppm)	
	0-3"	3-6"	0-3"	3-6"	0-3"	3-6"
0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
7	1.59	0.25	0.68	0.05	1.00	0.24
14	0.69	0.25	0.81	0.27	0.35	0.18
30	0.10	0.06	0.55	0.15	0.055	0.07
60	0.11	<0.05	0.87	0.08	<0.05	<0.05
90	0.07	<0.05	0.76	0.17	<0.05	<0.05
180	<0.05	<0.05	1.00	0.29	<0.05	<0.05

Test Location	$t_{1/2}$ (days)/Regression Coefficient		
	Anion	AMPA	Cation
CA	25.3/0.8627	91.6/0.4974	50.4/0.8593
IA	25.8/0.8536	82.8/0.6752	33.9/0.9835
FL[a]	23.3/0.8317	—[b]	29.6/0.6204

[a] Zero-day values not included in calculations. [Note that residues were nondetectable in all 0-day samples from the FL test. Thus, we assume that samples were collected just prior to treatment.]

[b] Residue values increased throughout the sampling period.

D. Study Author's Conclusions:

The submitted field dissipation studies contained materials and methods, data and $t_{1/2}$ values only. No conclusions were presented.

E. Reviewer's Discussion and Interpretation of Results:

The reviewer concludes that the submitted studies do not satisfy the environmental fate requirements for field dissipation data for the following reasons:

a) The presence of significant residues of the cation, anion, and AMPA in the 3-6" soil core segments indicates that leaching below 6" into the soil profile is likely. However, since no samples below 6" were collected, it is not possible to determine whether leaching to a sufficient depth for contamination of ground water will occur.

b) No information regarding analytical procedures was submitted.

c) Rainfall and irrigation data were either incomplete or nonexistent.

d) No data regarding the stability of residues in samples frozen for up to 1 year were submitted.

e) No adequate aerobic soil metabolism study has been submitted. Thus, it is not possible to ascertain at this time whether AMPA is the sole degradate for which analysis is required.

Although the deficiencies outlined in (b), (c), and (d) could be resolved without initiation of a new study, the deficiency cited in (a) is sufficiently serious to warrant a new study. We recommend that the aerobic soil metabolism data requirement be completed prior to initiation of a new field dissipation study to avoid submission of a study in which all degradates are not quantified (see item e).

The registrant must submit a field dissipation study, conducted in a relatively sandy soil, in which samples are collected for 4 months or until patterns of formation and decline of degradation products are established. Soil cores should be taken to a depth sufficient to reveal the complete leaching profiles of all residues. The registrant is encouraged to submit test protocol for our comment before initiating the study.

The reviewer notes that the results of the studies in the present submission differ significantly from those of a previously-submitted study (Accession no. 250548; see review dated 1/17/86) in which the author concluded that SC-0224 " . . . does not leach below 3 inches into the soil . . . " Also, in the previously-submitted study, no TMS cation was detected (<0.05 ppm) at any depth (0-12") or sampling interval. [Previous study was conducted in Virginia at 6 lb ai/A on a soil with organic matter content of 0.7-2.8% and pH 5.5-7.6.]

11. COMPLETION OF ONE-LINER:

One liner initiated (appended).

12. CBI APPENDIX:

No CBI appendix.

Sulfosate environmental fate/exposure assessment review

Page ______ is not included in this copy.

Pages 13 through 18 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

X FIFRA registration data

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

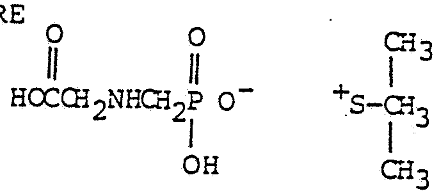
___ The document is not responsive to the request

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.

Date 12/31/85

EXPOSURE ASSESSMENT BRANCH ONE LINER

EAB File No: 128501 TYPE PESTICIDE: herbicide STRUCTURE



$$HO\overset{O}{\overset{\|}{C}}CH_2NHCH_2\underset{OH}{\underset{|}{\overset{O}{\overset{\|}{P}}}}O^- \qquad {}^{+}\underset{CH_3}{\underset{|}{\overset{CH_3}{\overset{|}{S}}}}-CH_3$$

TYPICAL USES: proposed for non-crop areas

COMMON NAME: sulfosate

CHEMICAL NAME: trimethylsulfonium carboxymethylaminomethylphosphonate

Formulation Types: liquid concentrates

Degradation Products: aminomethylphosphonic acid

CHEMICAL AND PHYSICAL PROPERTIES

Mole. Wt.	Aqueous Solubility (molar)	Vapor Pressure	K_{ow}
245	17.6 x 10^6 g	≤4 x 10^{-7} at 25°C	<<10

Soil Adsorption Coefficient

Soil Type	pH	% Soil O.M.	K Value cation	K Value anion	Soil TLC R_f cation	Soil TLC R_f anion
sandy loam	5.6	1.1	49	13	0.06 ± 0.03	0.20 ± 0.04
loam	6.9	1.9	300	16	0.01 ± 0.02	0.16 ± 0.03
sand	6.7	2.5	29	33	0.09 ± 0.03	0.08 ± 0.02
loam	5.7	6.2	-	19	0.0 ± 0.0	0.16 ± 0.08

Hydrolysis pH	Temp.	$T^1/_2$
5	25°C	stable
7	25°C	stable
9	25°C	stable

Photolysis	pH	$T_{1/2}$ cation	$T_{1/2}$ anion
Air:			
Soil:		stable	382 h
Water:	5	stable	14.6 d
	7	stable	77.9 d
	9	31.7 d	41.6 d

Mobility Class

(1) Immobile - cation
(2) Low - anion
(3) Low to Mod.
(4) Moderate
(5) Mobile

Degradation - Laboratory Half-life

		$T^1/_2$ cation	$T^1/_2$ anion
Soil Aerobic:	loam	192 d	27.9 d

Soil Anaerobic: $T^1/_2$ ______

Aquatic Aerobic: ______

Aquatic Anaerobic: ______

EAB Chemical One-Liner
Chemical: sulfosate

Degradation - Field Half-life

		$T^1/_2$		$T^1/_2$
Terrestrial [Crop Site]	cation	29.6 - 50.4 d	Forestry [Crop Site]	
	anion	23.2 - 25.8 d		
Aquatic [Crop Site]			Other [Crop Site]	

ENVIRONMENTAL EXPOSURE

Found in Ground Water (Y/N)?

Site(s) Level:

Reentry Interval Established? No

Rotational Crop Restrictions: Not applicable.

Fish Bioaccumulation Factors

Species	Tissue Edible	Viscera	Whole Fish	Duration (Half-life)
	X	X	X	
	X	X	X	
	X	X	X	

EXPOSURE ASSESSMENT:

Degradation Summary (including degradation product names and structures):

Sulfosate consists of an N-(phosphonomethyl)glycine anion and a trimethylsulfonium cation. The anion degrades to aminomethylphosphonic acid (AMPA) via photolysis (aqueous and soil). AMPA was also a degradate formed from the the anion in field dissipation tests.

REFERENCES: EAB files
One-Liner Writer: D. Edwards