CASE GS0178 GLYPHOSATE STUDY 18 PM 25 06/16/83

CHEM 103601 Isopropylamine glyphosate

BRANCH EFB DISC 30 TOPIC 4-17-85

FORMULATION 90 - FORMULATION NOT IDENTIFIED

FICHE/MASTER ID 00039381-C CONTENT CAT 0

Sleight III, B.H. 1975. Exposure of fish to Roundup, accumulation, distribution, and elimination. In Determination of residues of glyphosate and its metabolite in aquatic use of Roundup herbicide.

SUBST. CLASS = S.

DIRECT RVW TIME = 7 (MH) START-DATE END DATE

REVIEWED BY: W. Frantz
TITLE: Staff Scientist
ORG: Dynamac Corp., Enviro Control Division, Rockville, MD
TEL: 468-2500

SIGNATURE: W. Frantz DATE: Apr. 17, 1985

APPROVED BY:
TITLE:
ORG:
TEL:

SIGNATURE: DATE:

CONCLUSION:

Laboratory Accumulation - Fish

This study could not be validated because insufficient data were presented to support the reported results. In addition, this study would not fullfill EPA Data Requirements for Registering Pesticides because the purity of the test substance was not reported, radioactive residues were not characterized, cumulative fish mortality was not reported, and radioactive residues in viscera, whole-body tissue, and exposure water, were not provided.

2008893

MATERIALS AND METHODS:

Bluegill sunfish (Lepomis macrochirus; average length and weight 42 mm and 1.3 g, respectively) were maintained for 30 days, at unspecified conditions, prior to test initiation. Flow-through aquatic exposure systems were prepared using three 30-l aquaria equipped with continuous flow-through proportional dilution apparutus, as described by Mount and Brunge [1967. Water Res. (1) 21-24]. Aerated well water [pH 7.3, total hardness ($CaCO_3$) 40 ppm, dissolved oxygen >5.0 ppm, temperature 21 ±1 C] was provided to each aquarium at a flow rate of 5 l/hr (4 turnovers/day). Bluegill (100) were placed in each aquarium. Two aquariums were continuously treated with [^{14}C]glyphosate (CP 67573, specific activity 86 µCi/mg, purity and source unspecified), at 0.005 and 0.625 ppm. The third aquarium served as an untreated control.

Water and fish samples were taken at 1, 3, 7, 10, 14, 21, and 28 days of exposure. After the 28-day exposure period, fish remaining in the treated aquariums were transferred to aquariums containing untreated water for 14 days of depuration.

Water samples (500 ml) were concentrated on a rotary evaporator to <10 ml, diluted with distilled water to 25 ml, and quantified using LSC. Fish (5) were eviscerated, the edible tissue combusted, the evolved $^{14}CO_2$ trapped in ethanolamine, and quantified using LSC. The recovery values ranged from 98 to 100%. Detection limits in fish and and water exposed to the lower (0.005 ppm) and higher (0.612 ppm) treatment rates were 0.01 and 0.001, and 1.0 and 0.005 ppm, respectively. The recovery value in water was 84%.

REPORTED RESULTS:

Cumulative fish mortality during the test period was not reported; however, the fish were reported to have been in excellent physical condition. Pretreatment fish mortality was <1%. [^{14}C]Glyphosate residues in the edible tissue of bluegill sunfish accumulated to maximum concentrations of <1.13 and 0.011 ppm on day 28 of exposure when exposed to average [^{14}C]glyphosate concentrations of 0.61 and 0.005 ppm, respectively (Table 1). Radioactive residues accumulated during the 14-day depuration period in both treatments. Maximum concentrations of [^{14}C]glyphosate residues exposed to 0.612 and 0.005 ppm occurred at day 7 (3.07 ppm) and day 10 (0.031 ppm) of depuration, respectively. After 28 days of exposure to 0.005 and 0.612 ppm [^{14}C]-glyphosate, average radioactivity detected in the visceral tissue of bluegill sunfish was 0.24 and 11.1 ppm, respectively.

DISCUSSION:

1. Radioactive residues were not characterized.

2. The purity of the test substance was not reported.

3. Radioactive residues in whole-body tissues were not provided, and were incompletely provided for visceral tissue.

4. Cumulative fish mortality was not reported.

5. [^{14}C]Glyphosate concentrations in water were not presented at any individual sampling interval. Concentrations were, instead, expressed as an average value for the whole experiment.

6. The increase in ^{14}C residues in the edible tissue during depuration was attributed to a redistribution of ^{14}C residues within the fish. Without data on ^{14}C residues in visceral tissue during the depuration period, this explanation could not be substantiated.

Table 1. [^{14}C]Glyphosate residues (ppm) in the edible tissue of bluegill sunfish during a 28-exposure period, to [^{14}C]glyphosate at 0.612 and 0.005 ppm, and a 14-day depuration period.

	Sampling interval (days)	Application rate			
		0.612[a] ppm	BCF[b]	0.005[a] ppm	BCF[b]
Exposure	1	1.02 (0.34)[c]	1.7	ND	
	3	<1.01 (0.27)	1.6	0.01	2.0
	7	ND		ND	
	10	ND		ND	
	14	ND		<0.011 (0.002)	2.2
	21	ND		ND	
	28	<1.13 (0.13)	1.9	0.011 (0.0088)	2.2
Depuration	1	2.31 (0.36)	3.8	0.022 (0.003)	4.4
	3	1.59 (0.24)	2.1	0.022 (0.005)	4.4
	7	3.07 (5.00)	5.0	0.020 (0.006)	4.0
	10	1.20 (0.22)	2.0	0.031 (0.010)	6.2
	14	2.08 (0.47)	3.4	0.16 (0.003)	3.2

[a] Average measured concentrations.

[b] Bioconcentration factor (BCF) = $\frac{\text{concentration in fish tissue}}{\text{avg. concentration in water}}$.

[c] Average (± SD) based on 10 radiometric analyses.