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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN
7-14-89

July 14, 1989

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: NON-DIETARY EXPOSURE BRANCH REGISTRATION
STANDARD CHAPTER ON SIMAZINE

TO: William Hazel, Ph.D.
Registration Standards and Special Review Section
Science Analysis and Coordination Branch
Health Effects Division (H7509C)

FROM: Al Nielsen, Acting Chief *Al Nielsen*
Field Studies and Special Projects Section
Non-Dietary Exposure Branch
Health Effects Division (H7509C)

THRU: Charles L. Trichilo, Ph.D., Chief
Non-Dietary Exposure Branch
Health Effects Division (H7509C)

Attached is the Non-Dietary Exposure Branch Registration Standard Chapter for Simazine. Curt Lunchick's exposure assessment and narrative of May 22, 1989, can be used as is and we have added a data requirement table as well (attached).

Curt and I went through the narrative and the data table and we are in agreement regarding the content of these documents for the Registration Standard.

If you have any questions, please see me as soon as possible.

Thank you.

CC: CIRCULATION
CORRESPONDENCE FILE
SIMAZINE FILE
SACB

Attachments



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

MAY 22 1989

SUBJECT: Nondietary Exposure Assessment of Simazine

TO: Esther Saito
Registration Standards and Special Review Section
Science Analysis and Coordination Branch
Health Effects Division (H7509C)

Henry Spencer
Review Section II
Toxicology Branch I
Health Effects Division (H7509C)

FROM: Curt Lunchick *Curt Lunchick*
Registration Standards and Special Review Section
Science Analysis and Coordination Branch
Health Effects Division (H7509C)

Attached is the nondietary exposure assessment for simazine.

cc: A. Kocialski
C. Trichillo
M. Firestone
A. Nielsen

1.0 INTRODUCTION

The Nondietary Exposure Branch and the Science Analysis and Coordination Branch of the Health Effects Division have reviewed the existing exposure data bases for the herbicide simazine. The review was conducted in preparation for the upcoming reregistration guidance document for simazine.

2.0 SIMAZINE USE PATTERN

Simazine is a triazine herbicide that is applied as a preemergent, preplant incorporated, at planting, or as a postemergent (Saulmon, J., Qualitative Use Analysis of the Herbicidal Uses of Simazine, Biological and Economics Analysis Division, 13 January 1989). Its primary use is as a selective herbicide to control broadleaf and grass weeds. Simazine's use is estimated as follows:

1. Corn - 30%
2. Fruits and Nuts - <22%
3. Aquatic Sites - 27%
4. Rights-of-Way - 3%
5. Tree Nurseries - 1%
6. Nonagricultural Uses - 9%

Simazine use on alfalfa had accounted for 10% of simazine use but Ciba-Geigy voluntarily cancelled the use in 1987. Simazine is formulated as a granular, wettable powder, dry flowable, emulsifiable concentrate, pellet, and as a ready-to-use product. The herbicide is primarily applied by ground boom, directed spray, spreaders, or water treatment. Aerial application is also registered for certain uses.

3.0 SIMAZINE USE ON CORN

In conducting an exposure assessment for simazine on corn it will be assumed that simazine is applied to corn at 2.0 lbs a.i./acre. A private corn grower averages 195 acres in corn and may treat 110 acres/day by ground boom. One application per year is typical. The private farmer would handle 220 lbs a.i. on the first day and 170 lbs a.i. on the second day. It is assumed open pouring of the emulsifiable concentrate would predominate. The application time required would be 5.1 hours to treat 110 acres and 3.8 hours to treat the remaining 85 acres.

The commercial applicator is assumed to handle simazine for 15 days annually. Using larger rigs than private growers, the commercial applicator can treat up to 400 acres daily. It is unlikely that any commercial applicator would treat 400 acres with simazine daily for 15 separate days. During any day that simazine is used it is likely that less than 400 acres will be treated with simazine. Mixing/loading is predominately with 55 gallon containers and mechanical transfer systems. The

mixer/loader could handle up to 800 lbs a.i. daily. Application time required to treat 400 acres with a 50' boom is assumed to be 5.3 hours.

Aerial application is assumed to be conducted 15 days annually. A total of 385 acres is likely to be sprayed on a given day and requires 0.8 hours to treat the 385 acres. The mixer/loader would be a separate individual from the pilot and would load 770 lbs a.i. by mechanical transfer systems from 55 gallon containers of the emulsifiable concentrate.

The dermal exposure to handlers of simazine emulsifiable concentrate was estimated utilizing HED's surrogate data base. A detailed description of the data base is provided in the exposure assessment conducted on the triazine herbicide, atrazine (Lunchick, C., Exposure Assessment for Policy Group, EAB #80077, 6 January 1988). Dermal exposure was estimated assuming the use of long pants and long sleeve shirts during mixing/loading and application. It was assumed that mixer/loaders wore chemical resistant gloves in addition to the shirt and pants. The dermal exposure to a mixer/loader open pouring simazine would be 0.93 mg/lb a.i. and if a mechanical transfer system was used the dermal exposure would be 0.015 mg/lb a.i. Ground boom applicator exposure averages 4.6 mg/hr at an application rate of 1.0 lbs a.i./acre, but ranges from 0.4 to 72 mg/hr. Commercial applicators are more likely to be at the lower half of the range since they are more likely to use large rigs. Pilot exposure averaged 0.58 mg/hr at a 1.0 lb a.i./acre application rate. Based on these estimates, simazine exposure is estimated as follows for a 70 kg individual:

Private Grower

Daily Mixing/loading: $0.93 \text{ mg/lb a.i.} \times 220 \text{ lbs a.i./day} \times 1/70 \text{ kg} = 2.9 \text{ mg/kg/day}$

Daily Application: $4.6 \text{ mg/hr} \times 2 \times 5.1 \text{ hrs/day} \times 1/70 \text{ kg} = 0.67 \text{ mg/kg/day}$

Combined Daily: $2.9 \text{ mg/kg/day} + 0.67 \text{ mg/kg/day} = 3.6 \text{ mg/kg/day}$

Annual Mixing/loading: $0.93 \text{ mg/lb a.i.} \times 390 \text{ lbs a.i./day} \times 1/70 \text{ kg} = 5.2 \text{ mg/kg/yr}$

Annual Application: $4.6 \text{ mg/hr} \times 2 \times 8.9 \text{ hr/yr} \times 1/70 \text{ kg} = 1.2 \text{ mg/kg/yr}$

Combined Annual: $5.2 \text{ mg/kg/yr} + 1.2 \text{ mg/kg/yr} = 6.4 \text{ mg/kg/yr}$

Commercial

Daily Mixer/Loader: $0.015 \text{ mg/lb a.i.} \times 800 \text{ lbs a.i./day} \times 1/70 \text{ kg} = 0.17 \text{ mg/kg/day}$

Annual Mixer/Loader: $0.17 \text{ mg/kg/day} \times 15 \text{ days/yr} = 2.6 \text{ mg/kg/yr}$

Daily Applicator: $4.6 \text{ mg/hr} \times 2 \times 5.3 \text{ hrs/day} \times 1/70 \text{ kg} = 0.70 \text{ mg/kg/day}$

Annual Applicator: $0.70 \text{ mg/kg/day} \times 15 \text{ days/yr} = 10 \text{ mg/kg/yr}$

If the commercial mixer/loader and applicator were the same individual, the combined daily exposure would be 0.87 mg/kg/day and the combined annual exposure would be 13 mg/kg/yr.

Aerial

Daily Mixer/Loader: $0.015 \text{ mg/lb a.i.} \times 770 \text{ lbs a.i./day} \times 1/70 \text{ kg} = 0.17 \text{ mg/kg/day}$

Annual Mixer/Loader: $0.17 \text{ mg/kg/day} \times 15 \text{ days/yr} = 2.5 \text{ mg/kg/yr}$

Daily Pilot: $0.58 \text{ mg/hr} \times 2 \times 0.8 \text{ hrs/day} \times 1/70 \text{ kg} = 0.013 \text{ mg/kg/day}$

Annual Pilot: $0.013 \text{ mg/kg/day} \times 15 \text{ days/yr} = 0.20 \text{ mg/kg/yr}$

4.0 OTHER SIMAZINE USES

The Health Effects Division has minimal data to conduct exposure assessments for orchard, aquatic, rights-of-way, and tree nursery uses of simazine. Additionally, there is insufficient data for an assessment of simazine exposure from granular uses. The U.S. Department of Agriculture, Forest Service has conducted an exposure study on pesticides used in tree nurseries. A final report on the study is not available presently, but will be made available upon completion. The other uses of simazine are identified as data gaps and may require registrant conducted studies upon final determination of the toxicity concerns of simazine.

5.0 RE-ENTRY EXPOSURE TO SIMAZINE

Because simazine is primarily used as a preemergent to early postemergent herbicide, re-entry exposure to treated areas is unlikely. The one exception would be tree nurseries. Simazine may be applied as a postemergent to conifer seedbeds. Tree nurseries are a labor intensive operation and the possibility of post application exposure is present. Re-entry data for simazine use in tree nurseries is reserved pending a review of the USDA Forest Service Tree Nursery exposure data.

6.0 CONCLUSIONS

The annual exposure for an individual treating their own corn with simazine is estimated to be 6.4 mg/kg/yr. A commercial ground applicator is estimated to receive an annual exposure of 2.6 mg/kg/yr during mixing/loading and 10 mg/kg/yr during application. A commercial operator that may do both the mixing/loading and application would receive an annual exposure of 13 mg/kg/yr. Commercial mixer/loaders for aerial operations would receive an annual exposure of 2.5 mg/kg/yr and pilots an annual exposure of 0.20 mg/kg/yr. The exposure estimates are not adjusted for the dermal absorption of simazine.

Data gaps exist that preclude assessing handler exposure during orchard, aquatic, rights-of-way, and tree nursery uses of simazine. Adequate data is unavailable to assess simazine exposure from handling the granular formulation. The above data gaps must be satisfied through the registration standard.

With the exception of tree nursery use, reentry exposure to simazine treated areas is considered unlikely based on the use patterns. Insufficient data are available to assess worker exposure to simazine treated areas in tree nurseries.



Curt Lunchick
Reregistration and Special Review Section
Science Analysis and Coordination Branch
Health Effects Division (H7509C)

TABLE I
Generic Data Requirements for Simazine

Data Requirement	Composition ¹	Use ² Pattern	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Biblio Citation	Must Additional Data Be Submitted Under FIFRA
<u>40 CFR 158.390 Reentry Protection</u>					
132-1 Foliar Dissipation	TEP	B	NO	—	NO ³
132-1 Soil Dissipation	TEP	B	NO	—	NO
133-3 Dermal Exposure	TEP	B	NO	—	NO ³
133-4 Inhalation Exposure	TEP	B	NO	—	NO
<u>40 CFR 158.75 Applicator Exposure Monitoring</u>					
231 Estimation of dermal exposure at outdoor sites.	TEP	A,B,D ⁵	NO	—	NO ⁴
232 Estimation of inhalation exposure at outdoor sites.	TEP	A,B,D	NO	—	NO
233 Estimation of dermal exposure indoor sites	TEP	—	NO	—	NO
234 Estimation of inhalation exposure indoor sites.	TEP	—	—	—	NO
<u>Post-Application Exposure Monitoring (40 CFR 158.75 & 158.390)</u>					
133-3 Dermal Exposure 233	TEP	H	NO	—	NO ⁴
133-4 Inhalation Exposure 234	TEP	H	NO	—	NO
132-1 Foliar Dissipation	TEP	H	NO	—	NO ⁴

1/ TEP = Typical End Use Product

2/ A = Terrestrial Food Crop Uses; B = Terrestrial Non-Food Uses(ornamental & tree nurseries); C = Aquatic, Food Crop; D = Aquatic Nonfood; E = Greenhouse, Food Crop; F = Greenhouse, G = Forestry Nonfood; H = Domestic and Commercial (Turfgrass) Outdoor; I = Indoor.

3/ Tree nurseries-reserved pending Agency review of USDA Forest Service exposure data and complete toxicology data base.

4/ Reserved pending Agency evaluation of complete toxicology data base.

5/ Handler exposure from orchard, aquatic, rights of way, and tree nurseries, including handler exposure from granular formulations.