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

NOV 9 1993

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM:

SUBJECT: EVALUATE NEW USES FOR THE PRODUCT CESSCO ACCUDOSE INSECTICIDE AEROSOL (a.i. PYRETHRINS) AND PROVIDE AN EXPOSURE ASSESSMENT

FROM: Bruce F. Kitchens, Chemist Bruce F. Kitchens

TO: Richard Mountfort, PM 10
Insecticide-Rodenticide Branch
Registration Division (H7505C)

THRU: Mark I. Dow, Ph.D., Section Head
Special Review and Registration Section II

Larry C. Dorsey, Chief
Occupational and Residential Exposure Branch
Health Effects Division (H7509C)

Please find below, the OREB review of:

DP Barcode: D194705

Pesticide Chemical Code: 069001

EPA Reg. No.: 006959-IE

EPA MRID No.: N/A

Review Time: 3.0 Days

PHED: N/A

I. INTRODUCTION:

A. Background:

Registration Division requests OREB to evaluate the new uses for the product Accudose Aerosol Insecticide. The active ingredients in Accudose Aerosol Insecticide are the pyrethrins at 0.70% a.i. and piperonyl butoxide (PBO), 3.5% a.i. Accudose Aerosol Insecticide is time released via an automatic timer from a 200 lb. non-refillable cylinder.

Accudose Aerosol Insecticide is used for the control of flies, horseflies, deer flies, black flies, mosquitoes, gnats, sand flies, midges, wasps, and small flying moths in horse barns, milking parlors, hog parlors, farrowing pens and holding pens for horses, cows, or hogs. Accudose Aerosol Insecticide is also used for temporary protection around pools, decks, and terraces.

No tox endpoints of concern have been identified to date[1]. The pyrethrins are scheduled for a Peer review in 1993. Pyrethrin is a Tox category 3 chemical for acute dermal and inhalation toxicity.

B. Purpose:

This review intends to evaluate the proposed new uses of Accudose Aerosol Insecticide and provide an estimate of worker exposure.

II. DETAILED CONSIDERATIONS:

At this time OREB does not have exposure monitoring data to accurately assess exposure to Accudose Aerosol Insecticide. In order to estimate exposure OREB will use a previous exposure assessment conducted on the active ingredient permethrin (EAB Memorandum entitled: Pyranha Exposure Assessment from L. Lewis to John Doherty July 15, 1987, see Attachment A). In this review, Permethrin is used in horse barns to control insects. Permethrin is sprayed through a series of nozzles placed 10 - 12 feet above ground. Each nozzle sprays approximately 1 oz. finished spray per minute.

Evaluation of the proposed registration reveals that Accudose Aerosol Insecticide is time released from sealed, nonrefillable 200 lb aerosol cylinders. An automatic timer distributes formulation to nozzles which dose the structure at a rate of a 1 second spray per 1000 cubic feet. Therefore, no mixer/loader/applicator exposure is expected. Because the exposure scenario for Accudose Aerosol Insecticide mirrors the previously mentioned permethrin exposure assessment, the exposures derived from the permethrin

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exposure assessment will serve as the exposure assessment for Accudose Aerosol Insecticide.

The following assumptions were used to calculate exposures:

- Completely enclosed space
- Space saturated at each use
- All active is in the vapor phase
- Ideal gas law applies (PV = nRT)
- No mixer/loader/applicator exposure
- No adjustment for dermal absorption
- Exposed individual weighs 70 kg
- Workers spend 3.5 hours/day and 5 days/week inside the enclosed space
- Workers spend 50% of their time inside the barn doing light work at a ventilation rate of 29 l/min, and the remainder of time spent doing heavy work at a ventilation rate of 60 l/min.
- Pesticide is applied to horse barns for 24 weeks/year. Sprayer operates twice each day.

Respiratory exposure to the pyrethrins incurred from the Accudose Aerosol Insecticide is approximately **0.69 µg/kg/yr.** Dermal exposure is estimated to be **0.001 and 0.13 mg/kg/yr** for pyrethrin and PBO, respectively.

III. CONCLUSIONS:

OREB concludes that the pyrethrin respiratory exposure from the Accudose Aerosol Insecticide is approximately **0.69 µg/kg/yr.** This exposure value represents a conservative estimate.

OREB further concludes that there should be no mixer/loader/applicator dermal exposure since this formulation is time released from a non-refillable 200 lb aerosol cylinder. Dermal exposure to workers re-entering structures treated with Accudose Aerosol Insecticide are estimated to be:

Pyrethrin - 0.001 mg/kg/yr
PBO - 0.13 mg/kg/yr

This estimate assumes that workers are wearing long-sleeved shirts, long pants, and protective gloves. Real world exposures are likely to be lower, especially, considering that the space could not be saturated with each use.

Additionally, OREB has the following concerns regarding the Accudose Aerosol Insecticide label. These issues should be addressed prior to registration of this product.

1. The label is not specific for the frequency of application.

2. The amount of active ingredient delivered with a 1-second spray is not specifically stated.

3. Reentry into treated area is not addressed on the label.

IV. REFERENCES:

1. Personal communication with J. Doherty, Tox Branch I, on 9/29/93 and 10/29/93.

2. EAB Memorandum entitled: Pyranha Exposure Assessment from L. Lewis to John Doherty July 15, 1987.

cc: B. Kitchens
Chemical File: **PYRETHRINS**
Circulation
Correspondence

ATTACHMENT A

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

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Pyranha Exposure Assessment

FROM: Laurie Lewis
Special Review Section
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

TO: John Doherty
Toxicology Branch
Hazard Evaluation Division (TS-769C)

THRU: Michael Firestone, Acting Chief
Special Review Section
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

EAB has completed an assessment of worker exposure to Pyranha. Annual exposure estimates have been provided for both mixer/loaders (dermal exposure) and for workers reentering treated horse barns (respiratory exposure). A copy of the assessment is attached.

cc: George LaRocca, PM #15
Edwin Budd
William Burnam

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4. Workers spend 50% of their time while inside the barn doing light work at a ventilation rate of 29 l/min, and the remainder doing heavy work at a ventilation rate of 60 l/min.

5. Pyranha is applied to horse barns for 24 weeks per year. The automatic sprayer operates twice each day when the workers are not in the barn; early in the morning (between 6 and 7 a.m.), and late in the evening (between 7 and 9 p.m.). (1)

6. Respiratory exposure to mixer/loaders is assumed to be negligible compared to dermal exposure.

7. Respiratory exposure estimates for workers reentering treated barns are worst-case, assuming 100% saturation of permethrin in the air for the entire exposure period. EAB has no data with which to assess the dermal exposure of these workers.

8. Mixer/loaders are assumed to handle 17 gallons of product per year (1:26 mix in a 55 gallon tank; tank is refilled 8 times per year). (1)

2.0 MIXER/LOADER EXPOSURE

A search of the published literature produced two articles containing useful information for mixer/loaders wearing protective gloves and using an open loading system. Although the proposed label for Pyranha does not require the use of protective gloves during mixing and loading operations, as a common sense safety practice the label should be amended to include the wearing of protective gloves. Dermal exposure was calculated assuming the mixer/loaders wore long pants and long-sleeved shirts which reduced the exposure to the covered areas by 50%.

The Abbott (2) and Lavy (3) studies provided 19 replicates in which mixer/loader exposure could be expressed in mg/lb ai handled. The average dermal exposure for the 18 Abbott replicates was 1.0 mg/lb ai, while the one Lavy replicate had a dermal exposure of 0.11 mg/lb ai. Based on a weighted average, the dermal exposure to mixer/loaders wearing protective gloves and using an open loading system was 0.95 mg/lb ai. To adjust this exposure rate for Pyranha application, the amount of active ingredient handled per year was calculated:

$$0.00685 \text{ (pyrethrins)} \times 8 \text{ lb/gal} = 0.055 \text{ lb ai/gal} \times 17 \text{ gal/yr}$$
$$= 0.935 \text{ lb ai/yr}$$

moles inhaled/day:

1.1×10^{-13} mol/L x 9345 L/day = 1.0×10^{-9} mol/day

ug/day:

3.91×10^{8} ug/mol x 1.0×10^{-9} mol/day = 4.0×10^{-1} ug/day

ug/wk:

4.0×10^{-1} ug/day x 5 days/week = 2.0 ug/week

ug/yr:

2.0 ug/week x 24 weeks/yr = 48 ug/yr

Annual exposure to permethrin, adjusted for 70 kg workers, is:

$$\frac{48 \text{ ug}}{\text{yr}} \times \frac{1}{70 \text{ kg}} = 0.69 \text{ ug/kg/yr}$$

4.0 CONCLUSIONS

Based on data from surrogate studies and on usage parameters provided by BUD, dermal exposure of mixer/loaders handling Pyranha for use in horse barns is estimated to be 1.3×10^{-2}, 0.13, and 2.6×10^{-2} mg/kg/yr for pyrethrins, piperonyl butoxide, and permethrin, respectively.

These estimates assume that workers are wearing long-sleeved shirts, long pants, and protective gloves which are not required by the Pyranha label. Because the use of protective gloves is a common sense safety practice that is known to substantially reduce dermal exposure, EAB recommends that Pyranha labels be amended to include the wearing of protective gloves. The exposure estimates are not adjusted for dermal absorption.

Worst-case respiratory exposure to workers reentering treated horse barns is estimated to be ~~1.3×10^{-2}~~ 0.69 mg/kg/yr for permethrin; respiratory exposure to pyrethrins and piperonyl butoxide is expected to be negligible. The worst-case estimate for permethrin assumed 100% saturation of the chemical in the air for the entire exposure period. No data are available to estimate the dermal exposure of these workers.

Laurie C. Lewis

Laurie Lewis
Special Review Section
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

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