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

OPP OFFICIAL RECORD
HEALTH EFFECTS DIVISION
SCIENTIFIC DATA REVIEWS
EPA SERIES 361

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

AUG 14 1992

MEMORANDUM

SUBJECT: EXPOSURE ASSESSMENT FOR THE USE OF CYROMAZINE ON MUSHROOMS.

FROM: Radamés Lozada, Chemist

Radamés Lozada 8/15/92

TO: Albin Kocialski, Acting Section Head
Registration Section
Chemical Coordination Branch
Health Effects Division (H7509C)

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

Mark I. Dow
Larry C. Dorsey

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

Please find below, the OREB review of:

DP Barcode: D177085

Pesticide Chemical Code: 121301

EPA Reg. No.: 100-ALA

EPA MRID No.: 422387-02

Review Time: 2 days

PHED: No

I. INTRODUCTION:

A. Background:

A petition for tolerance of Cyromazine on mushrooms and an application for registration of the end-use product, Armor[®] are currently pending EPA approval. This approval depends on EPA's assessment of the safety to workers exposed to Armor[®]. The registrant has submitted a surrogate study conducted to determine the exposure of workers to cyromazine during the mixing, loading, and application of Larvadex[®] 2SL in poultry houses (MRID # 422387-02). This study was reviewed by Radamés Lozada of OREB in a Memorandum dated 08/04/92. The registrant has also submitted a hazard and risk assessment for exposure in Armor[®]-treated mushroom houses (MRID # 422387-01).

B. Purpose:

OREB has been requested to review the submitted data and provide an exposure assessment for the use of Armor[®] on mushrooms. OREB was also asked to verify that risk to workers other than mixer, loader and applicators are addressed.

II. DETAILED CONSIDERATIONS:

The surrogate study was found acceptable in a memorandum from Radamés Lozada to Albin Kocialski titled "Exposure Assessment for the use of Cyromazine on Poultry", dated August 4, 1992. This surrogate study provides an accurate estimate of the exposure to workers using cyromazine with an analogous method of application. According to Armor[®]'s label, the proper application technique will employ a low pressure sprayer such as a coarse drenching spray. Three different types of sprayers (handheld, backpack and portable sprayer on wheels) were used to apply the pesticide product to poultry litter in the surrogate study. The workers that used the handheld or backpack sprayers did not have their monitoring media removed between mixer/loader and applicator functions. This procedure deviated from the approved protocol and the Subdivision U Guidelines but does not affect the validity of the study. Dermal exposure was measured by using outside protected and nonprotected patches. The patches were made of alpha-cellulose pads backed with aluminum foil, and attached to a plastic conference badge. The protected patches were made by taking an outside patch and loosely attaching on a layer of the respective protective clothing material to the upper collection face of the patch. The hand exposure was measured using white cotton gloves worn over latex gloves. Chemical resistant rubber gloves were worn over the white cotton gloves. Respiratory exposure was measured using personal high volume air monitoring pumps. The air monitors were fitted with two polyurethane foam filters as the

cyromazine filters. The foam filters were covered by a dust mask. There were a large number of non detectable samples particularly in the upper section of the body. This is to be expected given the type of equipment used. Using the exposure data from the surrogate study and making the assumptions below, OREB has estimated the exposure to workers when applying cyromazine to mushrooms.

A. Summary of Data Used to Calculate the Exposure:

1. The following data were obtained from the surrogate study titled "Exposure of Workers to Cyromazine during the Mixing, Loading, and Application of Larvadex[®] 2SL in Poultry Houses" (MRID # 422387-02).

The daily exposure values are summarized in the following table.

Task	Type of Sprayer	Daily Exposure (mg/kg BW/day)	
		Protected	Nonprotected
Combined Mixer/Loader and Applicator	Handheld	0.005	0.14
Combined Mixer/Loader and Applicator	Backpack	0.24 (1.71) ^a	0.65 (0.89)
Mixer/Loader	Portable Sprayer on Wheels	0.0003	0.13
Applicator	Portable Sprayer on Wheels	0.052	0.70

a. Value in parentheses includes the additional site 4 analyses. One worker at site four had a very high exposure to the shoulders and back. The registrant states that this was probably due to tank spillage between tank replicates.

- a. The average daily exposure for mixer/loader/applicator using protective clothing will be:

$$\frac{0.005 + 0.24 + 1.71 + 0.0523}{4} = 0.50 \text{ mg/kg BW/day}$$

- b. The average daily exposure for mixer/loader/applicator without protective clothing will be:

$$\frac{0.14 + 0.65 + 0.89 + 0.83}{4} = 0.63 \text{ mg/kg BW/day}$$

- 2. The following data were obtained from Larvadex[®] 2SL's label:

- a. Percent of cyromazine in the product 2.0 %
- b. Application rate 1 gal of spray/100 ft²

- 3. The following data were obtained from Armor[®]'s label:

- a. Percent of cyromazine in the product 5.0 %
- b. Application rate 43 fl. oz. of product/1000 ft²

- 4. The following data were obtained from the surrogate study:

- a. Each applicator added 2 gal of water to the sprayer followed by 13 fl. oz. of Larvadex[®] 2SL to produce a 0.1 % finished spray.

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B. Assumptions:

The following assumptions were made, to estimate daily exposure of mixer/loaders and applicators to cyromazine during the mixing, loading, and application of Armor[®] in mushroom houses:

1. An average adult male weighs 70 kg and has standard surface areas as outlined in The Pesticide Assessment Guidelines, Subdivision U, Applicator Exposure Monitoring.
2. Workers used the following protective clothing: long sleeve shirt, long pants, boots, rubber gloves and head covering. The applicators wore goggles and dust mask in addition to the above protective clothing.
3. An average worker has a respiratory volume of 29 liter/minute while performing light tasks. All activities associated with the application of Armor[®] to mushroom houses were assumed to be light.
4. The density of the final applied solution, when using Larvadex[®] 2SL or Armor[®] is 1 g/ml.
5. Armor[®] is applied at 43 fl. oz/1000 sq. ft, which is the maximum application rate according to the label.

B. Exposure Calculations

1. Adjustment for the amount of active ingredient applied:

The amount of AI applied when using Larvadex[®] 2SL is:

$$\frac{13 \text{ fl. oz. of sol'n}}{2.1 \text{ gal of spr}} * \frac{1 \text{ gal of spr}}{100 \text{ ft}^2} * \frac{29.57 \text{ ml}}{1 \text{ fl. oz.}} * \frac{1 \text{ g of sol'n}}{1 \text{ ml of sol'n}} * \frac{.02 \text{ g of ai}}{\text{g of sol'n}} = \frac{3.66 \text{ g of ai}}{100 \text{ ft}^2}$$

The amount of AI applied when using Armor[®]:

$$\frac{4.3 \text{ fl. oz. of sol'n}}{100 \text{ ft}^2} * \frac{29.57 \text{ ml}}{1 \text{ fl. oz.}} * \frac{1 \text{ g of sol'n}}{1 \text{ ml of sol'n}} * \frac{.05 \text{ g of ai}}{\text{g of sol'n}} = \frac{6.36 \text{ g of ai}}{100 \text{ ft}^2}$$

The ratio of ai is:

$$\frac{6.36}{3.66} = 1.74$$

2. The expected daily exposure, for mixer/loader/applicator using protective clothing, when applying Armor[®] will be:

$$0.50 * 1.74 = 0.87 \text{ mg/kg BW/day}$$

3. The expected daily exposure for mixer/loader/applicator without protective clothing, when applying Armor[®] will be:

$$0.63 * 1.74 = 1.10 \text{ mg/kg BW/day}$$

Armor[®]'s label should be amended to reflect the exposure situation presented in the surrogate study. The following statement must be added to the label:

Special Precautions to Prevent Exposure

"When mixing, loading and applying Armor[®] the following protective clothing must be worn: long sleeve shirt, long pants, boots, rubber gloves and head covering. If Armor[®] is applied in enclosed structures, the applicator must wear goggles and dust mask in addition to the above protective clothing.

In the surrogate study cyromazine residual monitoring was performed at each site. No cyromazine was detected in the breathing zone collected from pump filters or alpha-cellulose cards on the walls at any site. Trace residues (0.005 - 0.001 $\mu\text{g}/\text{cm}^2$) were detected on alpha cellulose cards placed on the floor near poultry litter at site 1 and 2. These residues are likely from water splash and not from volatilization of cyromazine. As in the poultry litter, there is not a habitual need for rapid re-entry in mushroom houses after the treatment. For these two reasons, OREB believes that post application exposure to other workers will be negligible or not of concern.

III. CONCLUSIONS:

OREB believes that the exposure to workers when mixing, loading and applying Armor[®] will not exceed that of Larvadex[®] 2SL. However, the exposure will vary according to the amount of applied AI. The expected daily exposure, for mixer/loader/applicator using protective clothing, when applying Armor[®] will be 0.87 mg/kg BW/day. The expected daily exposure for mixer/loader/applicator without protective clothing, when applying Armor[®] will be 1.10 mg/kg BW/day.

Armor[®]'s label should be amended to reflect the exposure situation presented in the surrogate study. The following statement must be added to the label:

Special Precautions to Prevent Exposure

"When mixing, loading and applying Armor[®] the following protective clothing must be worn: long sleeve shirt, long pants, boots, rubber gloves and head covering. If Armor[®] is applied in enclosed structures, the applicator must wear goggles and dust mask in addition to the above protective clothing.

Due to the results of the residual monitoring studies done in the surrogate study and because there is not a habitual need for rapid re-entry in mushroom houses after the treatment, OREB believes that post application exposure to other workers will be negligible or of not concern.

IV. REFERENCES:

1. Memorandum from Radamés Lozada to Albin Kocialski titled "Exposure Assessment for the use of Cyromazine on Poultry", dated August 4, 1992.

cc: R. Lozada, OREB
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Correspondence File
Chemical File (CYROMAZINE)
Circulation



13544

R060352

Chemical:	Cyromazine
PC Code:	121301
HED File Code	11000 Chemistry Reviews
Memo Date:	08/14/92 12:00:00 AM
File ID:	DPD177085
Accession Number:	412-04-0141

HED Records Reference Center
04/22/2004