Shaughnessy #: 081901

EAB Log-Out Date: JUL 13 1987

To: Donald Stubbs
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Registration Division (TS-767C)

From: Michael P. Firestone, PhD, Acting Chief M.P. Firestone
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Attached, please find the EAB review of...

Reg./File No.: 87-CA-03

Chemical: Chlorothalonil

Type Product: Fungicide

Product Name: Bravo 500

Company Name: Fermenta Plant Protection Company

Submission Purpose: Section 18 Emergency Exemption for the State of California

ACTION CODE: 511

Date In: 24 June 87 EAB #: 70773

Date Completed: 10 July 87 TAIS Code:

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

_____ Benefits and Use Division

Monitoring study requested by EAB: /___/

Monitoring study voluntarily conducted by registrant: /___/

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1.0 INTRODUCTION

The California Department of Food and Agriculture (CDFA) has requested a Section 18 emergency exemption for the use of chlorothalonil (Bravo 500) on mushrooms for Verticillium dry bubble or brown spot disease. CDFA previously requested an emergency exemption (21 Oct 86) which was denied due to unacceptable risk to sprayer mixers via dermal penetration (see letter from Douglas D. Campt, 13 Feb 87). CDFA has appealed this decision based on the current protective clothing requirements.

2.0 DISCUSSION OF DATA

No new data were submitted with the package. Therefore, EAB will employ surrogate data to estimate exposure. Specific information is listed below.

3.0 EXPOSURE ESTIMATE USING SURROGATE DATA

EAB employed a study by Nigg, et al. (1987), to estimate exposure to applicators applying chlorothalonil. The study measured exposure to an individual mixing/loading and soil drenching chlorpyrifos in a greenhouse. This operation is very similar to the drenching process employed in mushroom houses and should provide a reasonable estimate of such exposure.

Dermal Exposure

Dermal monitors were placed behind the clothing in the Nigg study thus providing actual exposure values. The replicate measured wore long pants, long-sleeved shirt, chemically resistant boots and mid-forearm length chemically resistant gloves during mixing/loading and spraying. A chemically resistant apron was worn during mixing/loading only. The dermal exposure calculations from the Nigg study are presented in Table 1. The calculated exposure for an individual mixing/loading and drenching is 1400 ug/kg ai handled. The proposed use of chlorothalonil calls for an application rate of 4.16 oz ai/1000 ft^2. The CDFA report lists 7168 ft^2 as the size of a mushroom house treatment room. The amount of active ingredient handled is as follows:

$$\frac{4.16 \text{ oz ai}}{1000 \text{ ft}^2} \times \frac{7168 \text{ ft}^2}{\text{treatment}} = 30 \text{ oz ai/treatment}$$

$$30 \text{ oz ai/treatment} \times 0.031 \text{ kg/oz} = 0.93 \text{ kg ai/treatment}$$

The exposure per treatment for each applicator would be:

$$1400 \text{ ug/kg ai} \times 0.93 \text{ kg ai/treatment} = 1300 \text{ ug/treatment}$$

Applicators work 35 hr/wk, 10 wk/yr. EAB will assume a 5 day workweek at 7 hours per day. The average time per treatment ranges from 45 minutes to 1 hour and 15 minutes and an applicator normally sprays approximately 2 hr/day. (These data were provided in a telephone communication with David Haskell, CDFA, 10 July 87.) EAB will use the least amount of time to calculate a worst-case exposure. Using these data, and assuming a 70 kg individual, the following exposures can be calculated.

$$\frac{1300 \text{ ug/treatment}}{0.75 \text{ hr/treatment}} = 1700 \text{ ug/hr}$$

$$1700 \text{ ug/hr} \times 2 \text{ hr/day} = 3500 \text{ ug/day}$$

$$\frac{3500 \text{ ug/day}}{70 \text{ kg individual}} = 50 \text{ ug/kg/day}$$

$$50 \text{ ug/kg/day} \times 5 \text{ day/wk} \times 10 \text{ wk/yr} = 2500 \text{ ug/kg/yr}$$

Respiratory Exposure

Respiratory exposure was below the limit of detection in the Nigg study. Respiratory exposure for drenching activities would normally be expected to be very minimal as drenching creates no spray and any airborne droplets should be relatively large and virtually non-respirable. However, chlorothalonil has a relatively high vapor pressure (< 0.01 mm Hg @ 40°C). Therefore, EAB recommends that applicators be required to wear respirators with pesticide cartridges in order to reduce risk of exposure via the inhalation route.

3.0 CONCLUSIONS

EAB has calculated exposure to mixer/loader/drenchers to be 2500 ug/kg/yr. This exposure is based on the workers employing chemically resistant gloves and boots, as well as a chemically resistant apron during mixing/loading. CDFA has stated that the companies treating mushroom houses already employ the use of gloves and boots as well as Tyvek coveralls, hats, goggles and respirators. EAB believes that these precautions should continue to be followed and should be made a part of the label for this use. This is in part based on the fact that Daconil 2787, which is the same formulation as Bravo 500, is registered for a similar use in greenhouses and has a label requiring gloves, boots, goggles or face shield, and respirators with pesticide cartridges. Use of a Tyvek suit would serve to cut down exposure from mixing/loading as a chemically resistant apron would and also provides additional protection from any other possible dermal exposure that might be caused in the drenching process.

4.0 RECOMMENDATIONS

EAB recommends that the Section 18 emergency exemption label require the use of specialized protective clothing to include: respirator with pesticide cartridges, mid-forearm chemically resistant gloves, chemically resistant boots, face shield or goggles, and Tyvek coveralls. The Tyvek coveralls should be replaced daily.

Karen E. Warkentien
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TABLE 1. Dermal Exposure to Greenhouse Drencher

Body Part	Dermal Flux Rate ($ug/cm^2/hr$)	Surface Area (cm^2)	Dermal Exposure (ug/hr)
Back	0.002	3550	7.1
Chest	0.009	3550	32
Arms	0.016	4120	66
Thighs	0.020	3820	76
Shins	0.003	2380	7.1
Hands	-----	----	116
TOTAL			304

Spray Rate = 0.213 kg ai/hr
Dermal exposure = 304 ug/hr
= (304 ug/hr)/(0.213 kg ai/hr)
= 1400 ug/kg ai

Exposure assumes long-sleeved shirt, long pants, mid-forearm length chemically resistant gloves and chemically resistant boots during mixing/loading and spraying. A chemically resistant apron was worn during mixing/loading only.

REFERENCES

1. Nigg, H. N., J. H. Stamper and W. D. Mahon. Pesticide Exposure to Florida Greenhouse Applicators. Draft Report CR-810743. US EPA. April 1987.

2. Personal communication with David Haskell, CDFA, 10 July 87.