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

JAN 22 1992

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

**MEMORANDUM**

SUBJECT: PP#7F3560/7H5543. Lambda-cyhalothrin in/on Wheat, Sweet Corn and Sunflowers. Amendment dated 5/9/91. Response to CB's Questions Concerning Wheat Metabolism. New Residue Data for Wheat and Wheat Processed Products.

DP Barcode: D166497. MRID #'s 419346-01, -02, -03. DEB #'s 8243, 8244.

FROM: Michael T. Flood, Ph.D., Chemist
Tolerance Petition Section II
Chemistry Branch I -- Tolerance Support
Health Effects Division (H7509C)

THROUGH: Robert S. Quick, Acting Chief
Chemistry Branch I -- Tolerance Support
Health Effects Division (H7509C)

TO: G. LaRocca/A. Heyward, PM 13
Insecticide-Rodenticide Branch
Registration Division (H7505C)

and

Toxicology Branch I
Health Effects Division (H7509C)

## Introduction

In an earlier CBTS review of this petition, additional information concerning the metabolism of lambda-cyhalothrin in/on wheat was requested (L. Cheng, memo of 8/15/90). ICI Americas Inc.'s response was reviewed by M. Flood in his memo of 4/16/91. Parent lambda-cyhalothrin was found to be the principal constituent of the residue in both wheat grain and wheat straw when these commodities were harvested at PHI's up to 30 days. Grain harvested 85 days after treatment showed much lower levels of parent, with the major constituents being the cyclopropane carboxylic acids. Less than half of the residue in grain could be identified, but the total activity in grain was less than 0.02 ppm. Although wheat straw was apparently harvested at 85 days also, metabolism data were not submitted. We therefore asked

that these data be submitted.

ICI has responded to our request in the present submission, but has also increased its use level (revised Section B) and has submitted supporting residue data and a report of a wheat processing study. ICI had previously proposed a tolerance of 0.01 ppm for residues of lambda-cyhalothrin in/on wheat grain. The previously proposed label included a grazing restriction on wheat forage and straw. The registrant is now amending his proposal to include the following tolerances:

| | | |
|---|---|---|
| Wheat Grain | 0.03 ppm | |
| Wheat Forage | 2.0 ppm | |
| Wheat Straw | 2.0 ppm | |
| Wheat Bran | 0.2 ppm | (FA) |
| Wheat Shorts, Germ | 0.05 ppm | (FA) |

PP#7F3560/7H5543 has been most recently reviewed in M. Flood's 9/19/91 memo, in which PP#1F3952/1H5607 (broccoli, cabbage, tomatoes) and FAP#0H5599 (imported dried hops) were also reviewed. New tolerances were proposed for sweet corn, sweet corn forage, and animal commodities on the basis of submitted residue data. Previously, sunflower residue data and a processing study were judged to adequately support the proposed tolerances of 0.03 ppm and 0.07 ppm for sunflower seeds and hulls, respectively (PP#7F3560/7H5543, memo of F. Boyd, 2/3/88).

**Summary of Deficiencies Remaining to Be Resolved**

1. The registrant should obtain written confirmation from Chemical Abstracts Service that the proposed CAS name is the correct Chemical Abstracts name. (Conclusion 1, memo of 9/19/91)

2. If metabolite HO-CPA is to appear in the tolerance expression or if residue data are necessary, a residue analytical method for this compound must be developed.

3. Storage stability of metabolites CPA, 3-PBAcid and 3-PBAlcohol in plant matrices must be determined for periods up to 26 months and in extracts for up to 42 days. (Conclusion, this memo) If residue data are necessary for the animal metabolite HO-CPA, storage stability data will be necessary for this compound also. (Conclusion 5d, memo of 9/19/91)

4. The animal matrices in which the metabolites CPA, 3-PBAcid and 4'-OH-3-PBAcid were shown to be stable under frozen storage should be identified. (Conclusion 5c, memo of 9/19/91)

5. The petitioner should submit a revised Section F in

which a tolerance of 0.05 ppm is proposed for sweet corn (K + CWHR). (Conclusion 6a, memo of 9/19/91)

6. The petitioner should submit a revised Section F in which the following tolerances are proposed:

| | |
|---|---|
| Wheat Grain | 0.05 ppm |
| Wheat Grain Dust | 2.0 ppm |
| Wheat Bran | 0.3 ppm (FA) |
| Wheat Shorts | 0.1 ppm (FA) |

(Conclusion, this memo)

7. The petitioner should submit a revised Section F in which the following tolerances are proposed for animal commodities:

| | |
|---|---|
| Milk, meat and mbyp of cattle, goats, hogs, horses and sheep | 0.02 ppm |
| Fat of cattle, goats, hogs, horses and sheep | 4.0 ppm |
| Meat, mbyp and eggs of poultry | 0.01 ppm |
| Fat of poultry | 0.02 ppm* |

(Conclusion 10a, memo of 9/19/91; * Conclusion PP#1F3992)

8. The petitioner should submit a revised Section F in which a tolerance for milkfat is proposed. (Conclusion 10b, memo of 9/19/91).

**Conclusions** (pertaining to this memo only)

1. ICI has satisfactorily responded to our request for metabolism data on wheat straw from "Plot B", reflecting two applications at 0.2 lb ai/A and PHI 85 days. Only grain was analyzed from this plot. Because the PHI is now 30 days and the results are implicitly included in "Plot C" data, analysis of the straw from Plot B is not necessary.

   The nature of the residue in plants is now adequately understood. Lambda-cyhalothrin is metabolized by cleavage of the ester linkage to form cyclopropane carboxylic acids and the corresponding phenoxybenzoic acid or alcohol. TOX and CB have decided that the plant metabolites need not appear in the tolerance expression at this time.

2. Residue data from 15 states support the proposed tolerance of 0.03 ppm for residues of lambda-cyhalothrin in/on wheat grain and 2.0 ppm for residues on wheat forage and wheat straw. ICI should propose a tolerance of 0.05 ppm for wheat grain due to analytical uncertainties at low levels.

3. As a result of the wheat processing study, ICI should propose food/feed additive tolerances (revised Section F) for residues of lambda-cyhalothrin in/on wheat bran (0.3 ppm) and wheat shorts (0.1 ppm). The company should also propose a **408** tolerance of 2.0 ppm for lambda-cyhalothrin in/on grain dust.

4. Submitted residue and processing data do not affect our conclusions concerning proposed tolerances for animal commodities.

**Recommendation**

CBTS continues to recommend against the proposed tolerances for reasons given in the "Summary", above.

**Detailed Considerations**

Formulation

The formulation marketed for wheat is now known as TROPHY® Insecticide, which has the same percentage active ingredient (ai) as KARATE® -- about 13%.

Revised Use Label

Use labels have been submitted for head lettuce and for wheat. The label for lettuce has been reviewed under PP#1F3985 (J. Morales, memo of 10/22/91) and will not be discussed in this memo. Lambda-cyhalothrin may be applied to wheat at 0.015-0.03 lb ai/A for most target pests but at 0.03-0.04 lb ai/A for control of chinch bug. Lambda-cyhalothrin may be applied either by air or ground.

Do not apply within 30 days of harvest. Do not apply more than 0.06 lb ai/A/season. This is a three fold increase over that proposed in PP7F3488.

In contrast to the previous proposed label, there is now no grazing restriction.

Nature of the Residue

The nature of the residue in animals is adequately

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understood and was most recently discussed in our 9/19/91 memo. However a question remained concerning plant metabolism:

CB Deficiency #1a (Conclusion 1a from our 4/16/91 memo)

> The nature of the residue in wheat straw is not adequately understood. Data from Plot B, reflecting two applications at 0.2 lb ai/A and harvest 85 days after the last application have not been submitted. Since the Plot B application scheme most nearly approximates the proposed application scheme, such data are necessary.

ICI Response

The response is given in MRID #419346-02. The metabolism study involved treatment of three plots. Plot A received 2 applications with a PHI of 14 days. Plot B received 2 applications with a PHI of 85 days. Plot C received 3 applications with a PHI of 30 days. The wheat grain in plot B was not sprayed directly; that in plot C was sprayed. By comparing the Plot B and Plot C residues, the potential for translocation of metabolites to grain was assessed. Analysis of the foliage from Plot B was not necessary because foliage from Plot C was analyzed. Both Plot B and Plot C received identical treatments on the same day. Plot C received a third treatment. Since Plot C foliage received the additional treatment and therefore represents the worst case, Plot C foliage was analyzed. No significant information would be gained by analyzing the foliage from Plot B since the results are already encompassed in the results from Plot C.

CB Comment

We had assumed that the foliage from Plot B had been analyzed but the data not reported. We noted in our 4/16/91 memo that "Since the proposed label in PP#7F3488 specified a PHI of 12 weeks for lambda-cyhalothrin when used on winter wheat and the PHI used in the Plot B studies was 85 days, this study is the most relevant of the three." We agree that the results are encompassed in the results from Plot C; but since that plot received a later dose, we would expect that the concentration of parent would be greater relative to other metabolites. However, due to the exaggerated use level in the study (10x for Plot C) and the fact that the newly proposed PHI of 30 days does correspond to the PHI of Plot C, we agree with ICI that additional work is not warranted. This deficiency is resolved.

The nature of the lambda-cyhalothrin residue in plants is now adequately understood. Lambda-cyhalothrin is metabolized by cleavage of the ester linkage to form cyclopropane carboxylic acids and the corresponding phenoxybenzoic acid or alcohol. In

most cases the parent compound is the principal consitutent of the residue. The cabbage plant metabolism study did show that, at least for that rac, the cis- and trans- cyclopropane carboxylic acids were the major constituents.

CB-1 and TB-1 have decided that the plant metabolites need not appear in the tolerance expression at this time.

Residue Data

The registrant has submitted residue data to support the proposed increase in use level.

Residue data have been submitted in the following report:

"Lambda Cyhalothrin (ICIA0321) Magnitude of the Residue Study on Wheat;" P.D. Francis and J.C. McKay; 5/6/91; Laboratory Project ID #'s 321-88-MR-18, 321-88-MR-21;0321-89-MR-12, 0321-89MR-14; Report No. RR 91-011B. (MRID # 419346-03)

During 1988 and 1989, 18 trials were conducted in AL, AZ, CA, CO, ID, IN, KS, LA, MN, MT, NE, ND, SD, WA and WY. According to Agricultural Statistics, 1988 these states accounted for over 89% of the U.S. wheat production in 1986. In these trials a total of 2 applications were made, the first at tillering and the last 20-47 days before harvest. In two trials, lambda-cyhalothrin was applied by air at a rate of 4-5 gallons of water per acre.

Samples were analyzed for parent and epimer at Huntingdon Analytical Services, Middleport, NY, and for metabolites at ICI Americas Inc.'s Western Research Center, Richmond, CA. The analytical procedures have been reviewed in our 9/19/91 memo. Recoveries of lambda-cyhalothrin from untreated controls of wheat grain, forage and straw fortified at levels of 0.013 to 2.1 ppm averaged 94%, 87% and 93%, respectively. Corresponding recoveries of the epimer, R157836, at spiking levels of 0.017 to 2.8 ppm were 91%, 85% and 92% for the same respective matrices. The metabolites PP890, 3-PBAcid and 3-PBAlcohol were spiked into untreated controls at levels ranging from 0.02 to 0.1 ppm. Recoveries of PP890 from grain, forage and straw averaged 105%, 99% and 74%, respectively. Recoveries of 3-PBAcid from these respective matrices averaged 111%, 106% and 83%; and recoveries of 3-PBAlcohol averaged 86%, 96% and 83%.

Samples were generally frozen within six hours after sampling and stored frozen before analysis, which occurred from 9-26 months after sampling for lambda-cyhalothrin and epimer and 12-35 months after sampling for the metabolites. The grain and straw samples from the two ND field trials were held 26-32 hours

before freezing. Sample extracts were held for up to 38 days before chromatography for lambda-cyhalothrin and epimer and for up to 14 days before chromatography for metabolites.

Storage stability data support analyses for lambda-cyhalothrin in various plant matrices for periods up to 26 months and in extracts for up to 42 days. Corresponding data for metabolites are still lacking (See our memo of 9/19/91).

Residue data for wheat forage and straw are summarized in the following tables. Wheat grain was harvested at the same time as straw, i.e., the PHI's are the same. All but three trials had lambda-cyhalothrin residues ≤0.01 ppm. Lambda-cyhalothrin levels of 0.02 ppm were found in samples from Kearney, NE and Chico, CA; and a level of 0.03 ppm was found in a sample from Enterprise, AL. The epimer and metabolites remained <0.01 ppm for all the field trials except for the Paynesville, MN trial, where a PP890 level of 0.02 ppm was found in grain.

Residues found for wheat forage and wheat straw are given in the following tables.

Table 1

Residues (mg/kg) of Lambda-cyhalothrin, Epimer, and Metabolites in Wheat Forage

| Location | Appln. Rate (lb ai/A) | Form. | PHI (days) | ICIA0321 | R157836 | PP890 | 3-PBA |
|---|---|---|---|---|---|---|---|
| Limon, CO | 2 x 0.03 | WG | 7 | 0.23, 0.18 | 0.02, 0.01 | 0.01 | <0.01 |
| | | WG | 7 | 0.31 | 0.02 | | |
| Yoder, WY | 2 x 0.03 | WG | 7 | 0.35 | 0.04 | | |
| | | WG | 7 | 0.51 | 0.03 | | |
| Rulton, KS | 2 x 0.03 | WG | 7 | 0.27 | 0.02 | 0.03 | <0.01 |
| | | WG | 7 | <0.01 | <0.01 | | |
| Kearney, NE | 2 x 0.03 | WG | 7 | 0.81, 0.68 | 0.06, 0.05 | 0.02, 0.02 | 0.01, 0.02 |
| | | WG | 7 | 0.42 | 0.03 | | |
| Bloomfield MT | 2 x 0.03 | WG | 7 | 0.33 | 0.03 | 0.03 | 0.03 |
| | | WG | 6 | 0.91 | 0.08 | 0.06 | 0.05 |
| Yuma, AZ | 2 x 0.03 | WG | 7 | 0.37 | 0.03 | | |
| | | WG | 7 | 0.30 | 0.02 | | |
| | | EC | 7 | 0.65 | 0.05 | 0.03 | 0.04 |
| | | EC | 7 | 0.09 | 0.05 | | |
| Chico, CA | 1 x 0.03 | EC | 7 | 0.59 | 0.07 | 0.03 | 0.02 |
| | | EC | 7 | 0.50 | 0.04 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Stockton, CA | 2 x 0.03 | WG | 7 | 0.33 | 0.03 | | |
| | | WG | 7 | 0.20, 0.19 | 0.02 | | |
| | | EC | 7 | 0.35 | 0.03 | 0.03 | 0.02 |
| | | EC | 7 | 0.29 | 0.02 | | |
| Enterprise, AL | 1 x 0.03 | WG | 43 | <0.01 | <0.01 | | |
| | | WG | 43 | <0.01 | <0.01 | | |
| | | EC | 43 | <0.01 | <0.01 | | |
| | | EC | 43 | <0.01 | 0.02 | | |
| Pullman, WA | 2 x 0.03 | WG | 8 | 0.28, 0.24 | 0.03 | | |
| | | WG | 7 | 0.24 | 0.02 | | |
| | | EC | 8 | 0.29 | 0.03 | 0.03 | 0.01 |
| | | EC | 7 | 0.43 | 0.05 | | |
| Columbia, LA | 1 x 0.03 | WG | 8 | 0.24 | 0.03 | | |
| | | WG | 8 | 0.38 | 0.04 | | |
| | | EC | 8 | 0.71 | 0.09 | | |
| | | EC | 8 | 0.40 | 0.05 | | |
| Heartland, IN | 2 x 0.03 | WG | 7 | 0.19 | 0.02 | | |
| | | WG | 7 | 0.10 | 0.01 | | |
| | | EC | 7 | 0.30, 0.29 | 0.04, 0.03 | 0.07, 0.10 | 0.01, 0.02 |
| | | EC | 7 | 0.16 | 0.02 | | |
| Yuma, AZ | 2 x 0.03 | WG | 7 | 0.30 | 0.03 | | |
| | | WG | 7 | 0.27 | 0.03 | | |
| | | EC | 7 | 0.43 | 0.04 | | |
| | | EC | 7 | 0.38 | 0.03 | | |
| Paynesville, MN | 2 x 0.03 | EC | 7 | 0.36, 0.34 | 0.03 | 0.03 | 0.02 |
| Washbury, ND | 2 x 0.03 | EC | 7 | 1.2, 1.1 | 0.10, 0.09 | 0.16 | 0.04 |
| Volga, SD* | 2 x 0.03 | EC | 7 | 0.29 | 0.02 | <0.01 | <0.01 |
| Washbury, ND* | 2 x 0.03 | EC | 7 | 0.01 | <0.01 | <0.01 | <0.01 |

* Aerial application

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Table 2

Residues (mg/kg) of Lambda-cyhalothrin, Epimer, and Metabolites in Wheat Straw

| Location | Appln. Rate (lb ai/A) | Form. | PHI (days) | ICIA0321 | R157836 | PP890 | 3-PBA |
|---|---|---|---|---|---|---|---|
| Limon, CO | 2 x 0.03 | WG | 30 | 0.33, 0.28 | 0.02 | 0.02 | 0.01 |
| | | WG | 40 | 0.24 | 0.02 | | |
| Yoder, WY | 2 x 0.03 | WG | 30 | 0.28 | 0.02 | | |
| | | WG | 45 | 0.02 | <0.01 | | |
| Rulton, KS | 2 x 0.03 | WG | 30 | 0.26 | 0.02 | 0.04 | 0.02 |
| | | WG | 45 | 0.14 | 0.01 | | |
| Kearney, NE | 2 x 0.03 | WG | 30 | 0.48, 0.58 | 0.05, 0.06 | 0.03 | 0.01 |
| | | WG | 41 | 0.45 | 0.05 | | |
| Bloomfield, MT | 2 x 0.03 | WG | 31 | 0.27 | 0.02 | 0.04 | 0.03 |
| | | WG | 44 | 0.07 | <0.01 | | |
| Yuma, AZ | 2 x 0.03 | WG | 30 | 0.19 | 0.02 | | |
| | | WG | 45 | 0.35 | 0.03 | | |
| | | EC | 30 | 0.50, 0.38 | 0.05, 0.04 | 0.04 | 0.06 |
| | | EC | 45 | 0.29 | 0.02 | | |
| Chico, CA | 2 x 0.03 | EC | 20 | 0.86 | 0.06 | 0.08 | 0.09 |
| | | EC | 34 | 1.1, 0.74 | 0.09, 0.04 | 0.08 | 0.08 |
| Stockton, CA | 2 x 0.03 | WG | 30 | 0.19 | <0.01 | | |
| | | WG | 44 | 0.17 | <0.01 | | |
| | | EC | 30 | 0.36 | 0.02 | 0.04 | 0.03 |
| | | EC | 44 | 0.25 | 0.02 | | |
| Enterprise, AL | 2 x 0.03 | WG | 29 | 0.70 | 0.12 | | |
| | | WG | 44 | 0.01 | <0.01 | | |
| | | EC | 29 | 0.70 | 0.11 | | |
| | | EC | 44 | 0.11 | 0.02 | | |
| Pullman, WA | 2 x 0.03 | WG | 34 | 0.29 | 0.03 | | |
| | | WG | 47 | 0.17, 0.16 | 0.02 | | |
| | | EC | 34 | 0.33 | 0.04 | 0.02 | 0.02 |
| | | EC | 47 | 0.26 | 0.03 | | |
| Columbia, LA | 2 x 0.03 | WG | 27 | 0.52 | 0.06 | | |
| | | WG | 45 | 0.30 | 0.05 | | |
| | | EC | 30 | 1.2, 1.4 | 0.19, 0.22 | 0.19 | 0.07 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | EC | 45 | 0.63 | 0.11 | | |
| Heartland, IN | 2 x 0.03 | WG | 30 | 0.35 | 0.07 | | |
| | | WG | 45 | 0.22 | 0.04 | | |
| | | EC | 30 | 0.50 | 0.08 | | |
| | | EC | 45 | 0.27 | 0.04 | | |
| Yuma, AZ | 2 x 0.03 | WG | 30 | 0.21 | 0.01 | | |
| | | WG | 45 | 0.30 | 0.04 | | |
| | | EC | 30 | 0.20 | 0.01 | | |
| | | EC | 45 | 0.23 | 0.02 | | |
| Paynesville, MN | 2 x 0.03 | EC | 30 | 0.24 | 0.03 | 0.03 | 0.02 |
| Jerome, ID | 2 x 0.03 | EC | 30 | 0.22, 0.19 | 0.02 | 0.03 | 0.02 |
| Washbury, ND | 2 x 0.03 | EC | 30 | 0.47 | 0.04 | 0.08 | 0.06 |
| Volga, SD* | 2 x 0.03 | EC | 30 | | | 0.01 | 0.01 |
| Washbury, ND* | 2 x 0.03 | EC | 30 | 0.84 | 0.14 | 0.06 | 0.05 |

* Aerial application

Grain and straw from the SD field trial were apparently not analyzed for parent and epimer, although both commodities were analyzed for metabolites.

The residue data support the proposed tolerances of 0.03 ppm for lambda-cyhalothrin in/on wheat grain and 2.0 ppm for lambda-cyhalothrin in/on wheat forage and wheat straw, but ICI should submit a revised Section B in which a tolerance of 0.05 ppm is proposed for wheat grain because of analytical uncertainties at low levels. (We had previously requested a similar revision for corn grain in our memo of 9/19/91.)

Processing Study

Wheat grain from plants treated in North Dakota at 2 x 0.15 lb ai/A (5x maximum seasonal rate) and harvested 30 days after the last application was processed into bran, shorts and germ, Red Dog, low grade flour, patent flour, and middlings. Grain dust was separated prior to processing. Residues found on wheat grain taken just prior to processing were 0.02 mg/kg lambda-cyhalothrin, <0.01 ppm epimer, 0.01 mg/kg PP890 and <0.01 mg/kg 3-PBA.

Wheat was processed at the Food Protein R & D Center at Texas A & M University, College Station, TX. A summary of the processing steps is given on page 13 of the report (MRID #419346-04). Processed samples were analyzed using ICI's Plant

Protection Division Residue Analytical Method No. 70 with modifications for lambda-cyhalothrin and epimer. The method is quite similar to that described in our 9/19/91 memo, except that acetonitrile is apparently not used. The method for metabolites is that described in the 9/19/91 memo. At a fortification level of 0.1 ppm cyhalothrin (43.2% ICIA0321, 56.8% R157836), recoveries of ICIA0321 from grain and processed products averaged 107±9%, recoveries of R157836 averaged 97±10%. At fortification levels of 0.05 and 0.1 ppm, recoveries of PP890 and 3-PBAcid from grain and processed products averaged 90±8% and 101±9%, respectively.

Residues of Lambda-cyhalothrin, epimer and metabolites on grain dust and processed products are given in the following table. All controls showed <0.01 ppm for each compound.

Table 3

Residues (mg/kg) of ICIA0321, R157836, and Metabolites in Processed Wheat Grain Products and Grain Dust

| Commodity | ICIA0321 | R157836 | PP890 | 3-PBA | Total |
|---|---|---|---|---|---|
| Grain | 0.02 | <0.01 | 0.01 | <0.01 | 0.03 |
| Bran | 0.09, 0.08 | 0.01 | 0.03, 0.01 | 0.02, <0.01 | 0.15 |
| Middlings | 0.02 | <0.01 | 0.01 | <0.01 | 0.03 |
| Shorts & Germs | 0.03 | <0.01 | 0.02 | <0.01 | 0.05 |
| Low Grade Flour | 0.01 | <0.01 | <0.01 | <0.01 | 0.01 |
| Patent Flour | 0.01 | <0.01 | <0.01 | <0.01 | 0.01 |
| Grain Dust (>2030 Microns) | 0.80 | 0.16 | 0.14, 0.12 | 0.14, 0.12 | 1.26* |
| Grain Dust (<420 Microns) | 1.96 | 0.33 | | | |

* Calculated from weighted averaged (vide infra).

Out of 50 lbs of grain, about 89 grams of dust was collected. the >2030 $\mu$ dust is 97% by weight of the total dust producted. The registrant has calculated a weighted average residue for grain dust to be 0.82 $\mu$g/g for ICIA0321 and 0.16 $\mu$g/g for R157836. This procedure is acceptable.

Concentration of residues occurs in bran (5x), shorts & germs (1.6x) and grain dust (42x). The registrant should propose a **408** tolerance of 2.0 ppm for residues of lambda-cyhalothrin in/on grain dust. Food/feed additive tolerances of 0.3 ppm and 0.1 ppm should be proposed for bran and shorts, respectively.

Meat, Milk, Poultry and Eggs

Wheat grain, forage, straw, milled byproducts and grain dust

are animal feed items. Wheat forage can constitute 25% in the diet of beef cattle and 70% of the diet of dairy cattle.

In our memo of 9/19/91 the maximum concentration of lambda-cyhalothrin in the diet of dairy cattle was calculated using a diet of 10% sweet corn forage, 25% tomato pomace, 5% brewers grains, 20% cottonseed and 50% wheat gain/soybean seed. The maximum concentration in the diet of beef cattle was calculated using a diet of 25% sweet corn forage, 25% tomato pomace, 5% brewers grains, 20% cottonseed and 25% wheat grain/soybean seed. Because it is unlikely that a diet would contain both corn and wheat forage at the same time, we consider the diet for beef cattle to produce the maximum potential exposure to lambda-cyhalothrin. Therefore, our maximum predicted residue for beef cattle remains unchanged. On the other hand, a diet for dairy cattle containing 70% wheat forage would result in a significant increase in exposure over that calculated previously. A diet for dairy cattle producing maximum exposure to lambda-cyhalothrin is given in the following table:

Table 4

Diet for Dairy Cattle Producing the Maximum Residues of Lambda-cyhalothrin

| Commodity | Maximum Diet Percentage | Tolerance | Contribution to Daily Diet |
|---|---|---|---|
| Wheat Forage | 70% | 2.0 ppm (8.0 ppm, dry weight basis) | 5.6 ppm |
| Cottonseed | 20% | 0.05 ppm | 0.01 ppm |
| Wheat grain | 10% | 0.05 ppm | 0.005 ppm |
| | | | **Total = 5.6 ppm** |

Based on results of a feeding study in which 25 ppm lambda-cyhalothrin was fed to dairy cattle -- a summary appears in our 9/19/91 memo -- the predicted maximum level of lambda-cyhalothrin in milk is 0.2 ppm. Levels of metabolites should still remain <0.005 ppm. In our earlier calculation the predicted concentration was 0.14 ppm, and we asked that ICI propose a tolerance of 0.2 ppm. A tolerance of 0.2 ppm is still the most appropriate for milk.

Forage and straw are not poultry feed items. Wheat grain may constitute up to 70 percent of the diet of turkeys and broilers and up to 50 percent of the diet of laying hens. The proposed increase in tolerance from 0.01 ppm to 0.05 ppm would not substantially change the lambda-cyhalothrin diet contribution as calculated in our 9/19/91 memo. Grain dust can constitute up to 20% of the diet of turkey/broilers and laying hens. However, we have already included sorghum grain dust in calculating the lambda-cyhalothrin dietary contribution for poultry (PP#1F3992, memo of M. Flood, 12/91). The registrant was asked to propose a

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tolerance of 0.02 ppm for residues of lambda-cyhalothrin in fat. We consider it very unlikely that grain dust from two sources would be fed in a single diet at their maximum possible levels. Hence, we conclude that no different tolerances need to be proposed for poultry commodities as a result of this petition.

**Other Considerations**

An International Residue Status Sheet was appended to our review of 9/19/91.

cc: SF, RF, Circu., C.Furlow(PIB/FOD), MikeFlood, E.Haeberer.
H7509C:CBTS:Reviewer(MTF):CM#2:Rm800A:305-6362:typist(mtf):12/23/91.
RDI:SectionHead:ETHaeberer:12/12/91:BranchSeniorScientist:RALoranger:
12/12/91.

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