4-29-97

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

APR 29 1997

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: HED Risk Assessment for Use of the New Chemical Insecticide Pyridaben in/on Citrus, Apples, Pears, Almonds, Peaches, Plums and Grapes; PC Code 129105; CAS 96489-71-3; PRATS Case #s 015679, 287259, 286727, 287896, 287789, & 285847; DP Barcode #s D233114, D233166, D233164, D234191, D233248, D233250, D233244, D233247, D233252, D233522, and D227535.

FROM: George Kramer, Kathryn Boyle, Felecia Fort, Richard Griffin, Linnea Hansen, Barbara Madden, and Steve Robbins
Registration Team
Risk Characterization and Assessment Branch
Health Effects Division (7509C)

THROUGH: Michael Metzger, Acting Chief
Risk Characterization and Analysis Branch
Health Effects Division (7509C)

TO: Richard Keigwin, Product Manager Team 10
Insecticide-Rodenticide Branch
Registration Division (7505C)

As requested, the Health Effects Division (HED) has completed a risk assessment for use of pyridaben on citrus, apples, pears, almonds, peaches, plums and grapes. The Hazard Assessment is from Sanjivani Diwan and Virginia Dobozy in Toxicology Branch II, the Dietary Exposure Assessment, Product Chemistry and Tolerance Assessment is from William D. Wassell in Chemistry Branch I, Tolerance Support, and the Dietary Risk Assessments from Richard Griffin and Brian Steinwand. All the studies described below have been found acceptable, except as noted.

I. EXECUTIVE SUMMARY

The Health Effects Division (HED) has reviewed toxicology and residue chemistry data submitted by the registrant in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and 40 CFR § 158 to support the use of pyridaben on citrus, apples, pears, and almonds; and tolerances on imported peaches, plums and grapes. Toxicology Branch II, HED has determined that the toxicology data base on pyridaben (98% a.i.) is adequate to

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support Section 3 Registration and a petition for establishing tolerances for pyridaben. All toxicity studies necessary to support the proposed use of Technical Grade Pyridaben have been reviewed and found to be acceptable and meet their respective guideline requirements. Some residue chemistry data requirements remain outstanding. HED has determined that pyridaben is a Group E (not likely to be carcinogenic to humans via relevant routes of exposure) with an RfD of 0.005 mg/kg/day. It was determined that exposure via inhalation is not a concern and therefore no risk assessment was required. The aggregate risk, through food and water, was estimated to be 12% of the RfD for the general U.S. population and 74% of the RfD for non-nursing infants <1 year old (the subgroup with the highest exposure). Anticipated residues were used in this determination. The chronic dietary risk exposure to pyridaben appears to be acceptable for the proposed tolerances. **Therefore, HED does not consider the risk of registering pyridaben for use on citrus, apples, pears, and almonds to exceed the level of concern.** HED can thus recommend in favor of time-limited tolerances on these crops. HED can also recommend in favor of time-limited tolerances on imported peaches, plums and grapes provided the petitioner resolves the following residue chemistry deficiency:

- Submission of validation data for Method D9312 on peaches, plums and grapes.

For establishing permanent tolerances, the following additional residue chemistry data are required:

- A revised analytical enforcement Method D9309 (for citrus).
- A revised analytical enforcement Method D9312 (for apples, almonds, peaches, plums and grapes).
- A revised analytical enforcement Method D9405 (for animal matrices).
- Magnitude of the residue data for citrus, apples, peaches, plums and grapes.
- A plum processing study.
- Storage stability data for apples and almonds.
- Submission of additional amounts of analytical reference grade pyridaben metabolites (PB-7, PB-7 methyl, and PB-9) with an MSDS to the EPA Standards Repository in RTP.

RISK CHARACTERIZATION

Dietary Risk- Food: Chronic dietary exposure estimates for

pyridaben utilized **anticipated residues.** The proposed pyridaben tolerances result in a Anticipated Residue Contribution (ARC) that is up to 74% of the reference dose. For acute dietary risk for the population subgroup with the highest exposure, non-nursing infants (<1 year old), the estimated Margin of Exposure (MOE) is 1250. HED considers the acute and chronic dietary risks to be acceptable for the purposes of establishing time-limited tolerances.

Dietary Risk- Water: HED does not have drinking water monitoring data available to perform a quantitative drinking water risk assessment for pyridaben at this time. Based on the available environmental fate data, Tier 1 screening tools, GENEEC and Leaching Index, have been used to estimate environmental concentrations of pyridaben in surface water and the leaching potential of pyridaben. Pyridaben is immobile and thus unlikely to leach to groundwater. For surface water, the GENEEC model estimates body-weight based chronic exposure values for pyridaben to be 9.7×10^{-7} mg/kg/day for the whole U.S. population and 1.8×10^{-6} mg/kg/day for non-nursing infants (<1 year old). These values represent <0.1% of the RfD. As GENEEC is a conservative screening tool and the exposure estimates for both adults and children are well below 1% of the RfD, HED concludes that the potential for chronic dietary exposure through drinking water is insignificant.

Non-Dietary (Residential and Occupational) Risks: Short-Term or Intermediate-Term- As part of the hazard assessment process, the Agency reviews the available toxicological database to determine the endpoints of concern. For pyridaben, the Agency does not have a concern for a short-term or intermediate-term occupational or residential risk assessment since the available data does not indicate any evidence of significant toxicity by the dermal or inhalation routes. Therefore, a short-term or intermediate-term occupational or residential risk assessment was not required. Chronic- As part of the hazard assessment process an endpoint of concern was determined for the chronic occupational or residential assessment. However, during the exposure assessment process, the exposures which would result from the use of pyridaben were determined to be of an intermittent nature. The frequency and duration of these exposures do not exhibit a chronic exposure pattern. The exposures do not occur often enough to be considered a chronic exposure i.e., a continuous exposure that occurs for at least several months. Therefore, a chronic occupational or residential assessment was not required. There is no chronic occupational or residential assessment to aggregate with the chronic dietary (food source and drinking water) assessment.

Aggregate Exposure/Risk: Acute- For the population subgroup with the highest exposure, non-nursing infants (<1 year), the maximum estimated single day exposure is 0.04 mg/kg/day from food sources and 0.00029 mg/kg/day from drinking water. The drinking water is two orders of magnitude lower than the food sources of exposure. The acute dietary exposer is essentially the exposure from food.

Thus, the aggregate acute dietary MOE is also 1250. Chronic- Based on the available data and assumptions used for dietary/water/residential exposure and risk estimates, the population group estimated to be the most highly exposed to pyridaben is non-nursing infants (<1 year old), with a risk estimate from combined sources equalling 74% of the RfD.

II. BACKGROUND

BASF Corporation has requested the establishment of time-limited tolerances for residues of the insecticide/miticide pyridaben [2-*tert*-butyl-5-(4-*tert*-butylbenzylthio)-4-chloropyridazin-3(2*H*)-one] in/on various crops. Tolerances are also proposed for residues of pyridaben and its metabolites PB-7 (2-tert-butyl-5-[4-(1-carboxy-1-methylethyl)benzylthio]-4-chloropyridazin-3(2*H*)-one) and PB-9 (2-tert-butyl-4-chloro-5-[4-(1,1-dimethyl-2-hydroxyethyl) benzylthio]-chloropyridazin-3(2*H*)-one) in meat and milk. Specifically, the petitioner has proposed the following time-limited tolerances:

PP#5F4543/FAP#5H5726:

Citrus	0.5 ppm
Citrus pulp, dried	1.5 ppm
Citrus oil	10 ppm
Milk	0.01 ppm
Meat-by-product*	0.05 ppm
Fat*	0.05 ppm
Meat*	0.05 ppm

* of cattle, goats, hogs, horses and sheep.

PP#6F4651/FAP#6H5745:

Apples	0.6 ppm
Apple pomace, wet	1.0 ppm

PP#6F4741:

Pears	0.75 ppm

PP#6F4721:

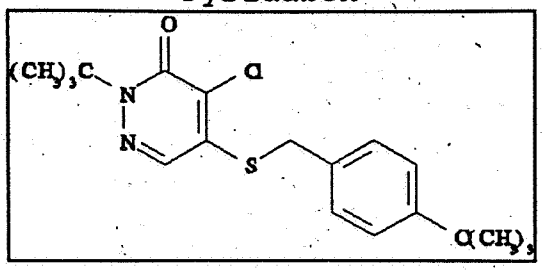
Almonds	0.05 ppm
Almond hulls	4.0 ppm

PP#4E4370/FAP#5H5728: (Imported Commodities)

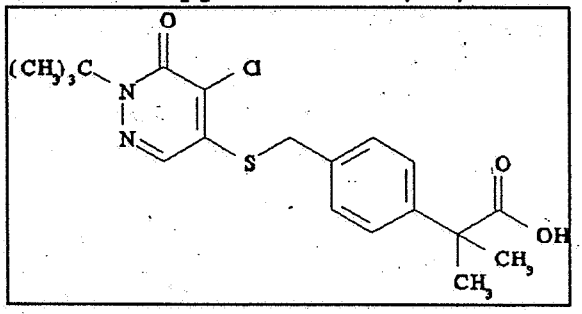
Peaches	0.05 ppm
Plums	0.05 ppm
Grapes	0.75 ppm

The chemical structures of pyridaben and its metabolites, PB-7 and PB-9, are as follows:

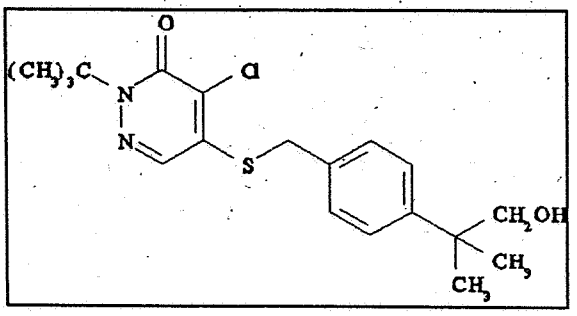
Pyridaben



PB-7
2-tert-butyl-5-[4-(1-carboxy-1-methylethyl)benzylthio]-4-chloropyridazin-3(2*H*)-one



PB-9
2-tert-butyl-4-chloro-5-[4-(1,1-dimethyl-2-hydroxyethyl) benzylthio]-chloropyridazin-3(2*H*)-one



III. USE PATTERN

Citrus: The product, Nexter® Miticide/Insecticide (EPA Reg. No. 7969-106) 75% ai, is to be applied twice as a foliar treatment to citrus trees. The applications may be made at 30 day intervals at 0.33 lb (0.25 lb ai)/A or at 90 day intervals at 0.66 lb (0.5 lb ai)/A. The proposed label specifies applications should be made greater than 100 gallons of spray per acre. The label specifies that no additives or adjuvants are necessary for effective use of the product. Do not apply more than 1.32 lb (1 lb ai) per acre per year. The pre-harvest interval (PHI) is 7 days. HED concludes the directions for use of Nexter™ Miticide/Insecticide on citrus are adequate.

Apples: The product, PYRAMITE™ Miticide/Insecticide (EPA Reg. No. 7969-125), is to be applied to apples for the control of apple rust mites, European red mites, and spider mites (McDaniel and twospotted). PYRAMITE™ is formulated as a wettable powder in water-soluble bags with 60% (by weight) pyridaben. The product (PYRAMITE™) is to be applied to apple trees at the rate of 0.28 to 0.825 lbs of product per acre per application (0.165 to 0.50 lbs ai/A). Applications may be repeated at 30-day intervals. The label specifies that no additives or adjuvants are necessary for effective use of the product. A 25-day PHI is specified. Do not exceed 1.33 lbs of product per acre per year (1.0 lbs ai/A/year). HED concludes the directions for use of PYRAMITE™ Miticide/Insecticide on apples are adequate.

Pears: The product, PYRAMITE™ Miticide/Insecticide (EPA Reg. No. 7969-125), is to be applied to pears for the control of pear rust mites, European red mites, spider mites (McDaniel and twospotted) and pear psylla at the rate of 4.4 to 13.2 ounces of product per acre per application (0.17 to 0.50 lbs ai/A). PYRAMITE™ is to be applied when mite populations are beginning to build. The application may be repeated at a 30-day interval. The proposed label specifies applications should be made in 100 to 400 gallons of spray per acre. A 7-day PHI is specified. The following restrictions are included on the proposed label: i. Do not apply by air or through any type of irrigation system; ii. Do not exceed 26.4 ounces of product per acre per year (1.0 lbs ai/A/year); and iii. Do not apply less than 4.4 oz of product or greater than 13.2 oz of product per acre per application. HED concludes the directions for use of PYRAMITE™ Miticide/Insecticide on pears are adequate.

Almonds: The product, PYRAMITE™ Miticide/Insecticide (EPA Reg. No. 7969-125), is to be applied to almonds for the control of European red mites and spider mites (McDaniel, Twospotted and Pacific) at the rate of 3.3 to 10.67 ounces of product per acre per application (0.15 to 0.50 lbs ai/A). PYRAMITE™ is to be applied when mite populations are beginning to build. The application may be repeated at a 30-day interval. The proposed

label specifies applications should be made in 100 to 400 gallons of spray per acre. A 7-day PHI is specified. The following restrictions are included on the proposed label: i. Do not apply by air or through any type of irrigation system; ii. Do not exceed 21.3 ounces of product per acre per year (1.0 lbs ai/A/year); and iii. Do not apply less than 3.3 oz of product or greater than 10.67 oz of product per acre per application. HED concludes the directions for use of PYRAMITE™ Miticide/Insecticide on almonds are adequate.

Peaches, Plums and Grapes: The submitted label indicates that the product is to be used on peaches, nectarines, plums, and grapes grown in Brazil and Chile. The maximum seasonal rate is 0.27 lb ai/A with one application at this rate permitted per season. The PHI indicated for peaches, nectarines, plums, and grapes is 28 days. A 21-day PHI is indicated for apples. Applications are to be made in 107-214 GPA of water using ground equipment (radial air sprayer or spray guns). HED concludes the directions for use of pyridaben peaches, nectarines, plums and grapes are adequate.

IV. PRODUCT CHEMISTRY

Product chemistry data were not submitted in conjunction with the subject petitions. BASF has previously registered a manufacturing-use product (MP) containing pyridaben as the active ingredient (EPA Reg. No. 7969-110). Product chemistry data were submitted in conjunction with the registration request for the MP and are the subject of RD's review of 9/9/93 (A. Smith, DP Barcode: D192990). HED concludes the product chemistry requirements for pyridaben have been satisfied.

V. HAZARD ASSESSMENT

[Except where noted, all studies were conducted with technical NC-129 (≥ 98% a.i.)].

A. Acute Toxicity

Acute Oral Toxicity/Rat (81-1): MRID # 426801-19

Acute Oral LD_{50} (95% confidence interval):

Males - 1100 mg/kg (510-2374 mg/kg)
Females - 570 mg/kg (373-872 mg/kg)

Toxicity Category: III

Classification: Guideline

Acute Oral Toxicity/Mouse (81-1): MRID # 426801-20

Acute Oral LD_{50} (95% confidence interval):

Males - 424 mg/kg (364-494 mg/kg)
Females - 383 mg/kg (318-462 mg/kg)

Toxicity Category: II

Classification: Guideline

Acute Dermal Toxicity/Rat (81-2): MRID # 426801-21

Acute Dermal LD_{50} (males and females) > 2000 mg/kg

Toxicity Category: III

Classification: Guideline

Acute Inhalation Toxicity/Rat (81-3): MRID # 426801-22

Acute Inhalation LC_{50} (95% confidence interval):

Males - 0.66 mg/l (0.56-0.78 mg/l)
Females - 0.62 mg/l (0.53-0.73 mg/l)

Toxicity Category: III

Classification: Guideline

Primary Eye Irritation/Rabbit (81-4): MRID # 426801-23

NC-129 is a slight ocular irritant in rabbits.

Toxicity Category: III

Classification: Guideline

Primary Dermal Irritation/Rabbit (81-5): MRID # 426801-24

NC-129 is not a dermal irritant in rabbits.

Toxicity Category: IV

Classification: Guideline

Dermal Sensitization/Guinea Pig (81-6): MRID # 426801-25

NC-129 is not a dermal sensitizer in female guinea pigs.

Classification: Guideline

Emergency Measures for Acute Toxicity/Rat: MRID # 426801-18

Acute LD_{50} in male rats was 137 mg/kg. Gastric lavage, performed at several time points after administration of this dose, was completely effective in suppressing the lethal effects of the chemical; other therapeutics were not effective.

Classification: Supplementary

B. Subchronic Toxicity

Subchronic Toxicity/Rat (82-1): MRID # 426801-26

NC-129 was administered in the diet to CD rats at dosages of 0, 30, 65, 155 and 350 ppm for 13 weeks. Two groups (0 and 350 ppm NC-129) were treated and then were continued on study untreated for another 4 weeks (reversibility study). Mean body weight gain was reduced in the 65 ppm group females and in the 155 and 350 ppm group males and females. Mean food consumption was decreased in the 155 and 350 ppm group males and females; food efficiency was reduced in these groups and also in the 65 ppm group females. Clinical chemistry parameters were affected in males and females in the 155 and 350 ppm groups. Urine specific gravity was decreased in the 350 ppm group females. The absolute weight of many organs was decreased and the relative weight increased in the 155 and 350 ppm group males and females, reflecting the effect of the chemical on growth. During the reversibility study, the only treatment-related effects were significant increases in alkaline phosphatase and blood urea nitrogen in the 350 ppm group males and significant decreases in protein, albumin and calcium in the 350 ppm group females.

NOEL = 65 ppm (4.94 mg/kg/day) for males; 30 ppm (2.64 mg/kg/day) for females
LOEL = 155 ppm (11.55 mg/kg/day) for males based on reduced body weight gain, food consumption, food efficiency and altered clinical pathology parameters; 65 ppm (5.53 mg/kg/day) for females based on reduced body weight gain and food efficiency

Classification: Minimum

Four-Week Inhalation Study/Rat: MRID # 426801-31

Material: Technical NC-129 (92.6% a.i.)

Four groups of Sprague-Dawley rats were exposed to atmospheric concentrations of 0, 1, 3 or 10 mg/m^3 of NC-129 for 6 hours five days a week for four weeks. Five animals/sex/group in the control

and high dose groups were allowed to recover for two weeks after the exposure. The 3 and 10 mg/m^3 groups had an increased incidence and severity of red nasal discharge during the last two weeks of the exposure. The 10 mg/m^3 group females weighed significantly less than the controls during the exposure regimen but had increased weight gain during the recovery period. The 3 and 10 mg/m^3 group females had significantly decreased albumin levels at Week 4 (end of exposure) but not at Week 6 (end of recovery). Both sexes of the 3 and 10 mg/m^3 groups had significant decreases in SGPT at Week 4 but not at Week 6. At the Week 4 necropsy, there were increases in the relative weight of several organs in the 10 mg/m^3 group males; the changes were not seen at Week 6. At the Week 6 necropsy, there were increases in the absolute and relative weights of the lung and spleen in the 10 mg/m^3 group females. There was an increase in eosinophilic material in two of four sections of the nasoturbinate area in the 10 mg/m^3 group animals.

NOEL = 1 mg/m^3 (.001 mg/l) in males and females
LOEL = 3 mg/m^3 (.003 mg/l) in males and females based on an increased incidence of clinical signs in males and females, reduced body weight gain in females and clinical chemistry changes.

Classification: Supplementary

Four-Week Dietary Range-Finding/Dog: MRID # 426801-33

Beagle dogs were fed dosages of 0, 200, 1000, 4000 or 16,000 ppm NC-129 for 4 weeks. Dose-related inappetence was seen in all the treated animals with corresponding decreases in food consumption and body weight. The toxic potential of the chemical could not be assessed due to the dramatically reduced intake.

Classification: Supplementary

Subchronic Toxicity/Dog (82-1): MRID # 426801-28

NC-129 was administered in capsules to beagle dogs at dosages of 0, 2.4, 12, 60 or 300 mg/kg/day for 13 weeks. Survival was reduced in the 300 mg/kg/day group males and females and in the 60 mg/kg/day group males. The surviving animals in the 300 mg/kg/day group were sacrificed at Week 9. Clinical signs of toxicity were increased in all the treated animals. Mean body weights were decreased in all the treated animals except the 2.4 mg/kg/day group males. Mean food consumption was decreased in the 300 mg/kg/day group males and females. Food efficiency was decreased in all the treated groups except the 2.4 mg/kg/day group males. A dose-related decrease in body fat was seen in all the treated animals at necropsy.

NOEL = < 2.4 mg/kg/day
LOEL = ≤ 2.4 mg/kg/day based on an increased incidence of clinical signs and a depletion of body fat in all treated animals

Classification: Supplementary

Subchronic Toxicity/Dog (82-1): MRID # 426801-27

NC-129 was administered in capsules to beagle dogs at dosages of 0, 0.5, 1.0, 4.0 or 16.0 mg/kg/day for 13 weeks. There was an increased incidence of clinical signs in the 4.0 and 16.0 mg/kg/day group males and females. Mean body weight gain was reduced in the 4.0 and 16.0 mg/kg/day group males and females. Mean food consumption was decreased in the male treated groups. All other parameters were comparable between the treated and control groups.

NOEL = 1.0 mg/kg/day for males and females
LOEL = 4.0 mg/kg/day for males and females based on an increased incidence of clinical signs and decreased body weight gain

Classification: Guideline

21-Day Dermal Toxicity/Rat (82-2): MRID # 426801-30

Repeated topical applications of NC-129 to about 10% the body surface area of rats at dosages of 30, 100, 300 and 1000 mg/kg for 21 days produced body weight decreases in the 300 mg/kg/day females and in the 1000 mg/kg/day males and females.

NOEL = 100 mg/kg/day
LOEL = 300 mg/kg/day based on decreased body weight gain in females.
Classification: Minimum

C. Chronic Toxicity and Carcinogenicity

Chronic Toxicity/Dog (83-1): MRID # 426801-34

NC-129 was administered in capsules to beagle dogs at dosages of 0, 1.0, 4.0, 16.0 or 32.0 mg/kg/day for one year. The number and incidence of clinical signs were increased in all the treated animals. Mean body weight gain was decreased in all the treated animals except the 1.0 mg/kg/day group males. Weekly food consumption measurements showed wide variations, however decreases in the treated animals could not account for the decreases in body weight gain. On necropsy, one female in the 32 mg/kg/day group was pale and emaciated; on histopathology, this animal had mild hepatocellular hypertrophy, mild atrophy of skeletal muscle and thymus and mild hypocellularity of the

femoral and sternal bone marrow.

NOEL = < 1.0 mg/kg/day
LOEL = ≤ 1.0 mg/kg/day based on increased incidences of clinical signs in both sexes and decreased body weight gain in females at 1.0 mg/kg/day

Classification: Minimum

Chronic Toxicity/Dog (83-1): MRID # 426801-35

NC-129 was administered in capsules to beagle dogs at dosages of 0 and 0.5 mg/kg/day for one year. The number and incidence of clinical signs were increased in the treated groups. Body weight gain was decreased in the treated females throughout the study. Other parameters were comparable between the treated and control groups.

NOEL = < 0.5 mg/kg/day for males and females
LOEL = ≤ 0.5 mg/kg/day for males and females based on an increased incidence of clinical signs in both treated sexes and decreased weight gain in the treated females

Classification: Minimum

Study on Induction of Salivation/Dog: MRID # 426801-29

NC-129 was administered to beagle dogs at dosages of either 0 or 300 mg/kg/dog (27-34 mg/kg/day) for 3 months. One group received the chemical in capsules that were soluble in the stomach; the other group received capsules that dissolved in the small intestine. The objective of the study was to assess if salivation resulted from taste and/or gastric irritation or from systemic toxicity, however the sign was not observed in any of the treated animals. Vomiting and diarrhea were observed in both treated groups. The dogs treated with stomach-soluble capsules had reduced body weight and body weight gain and food consumption. One dog in the group treated with stomach-soluble capsules had discoloration of the pyloric region of the stomach at necropsy. (The incidence of salivation in the dog was tabulated and submitted under MRID # 426801-51)

Classification: Supplementary

Carcinogenicity Study/Mouse (83-2): MRID # 426801-37

NC-129 was administered in the diet to CD-1 mice at dosages of 0, 2.5, 8.0, 25 or 80 ppm for 78 weeks. Body weight gain was significantly decreased in the 80 ppm group males and females throughout most of the study. Food consumption was comparable between the treated and control groups but food efficiency was decreased in the 25 and 80 ppm group males and the 80 ppm group

females during the first fourteen weeks of the study. At necropsy, there were increases in the relative weights of several organs from animals in the 80 ppm group, most likely due to decreases in terminal body weights. There was an increase in splenic extramedullary hematopoiesis at the interim sacrifice (53 weeks) and an increase in amyloidosis of various organs at the terminal sacrifice in the 80 ppm group males. There was no evidence of a carcinogenic effect of the chemical.

NOEL = 25 ppm (2.78 mg/kg/day) for males and females
LOEL = 80 ppm (8.88 and 9.74 mg/kg/day for males and females, respectively)
MTD = 80 ppm for males and females based on decreased body weight gain, decreased food efficiency and changes in organ weights and histopathology (males)

Classification: Guideline

Combined Chronic Toxicity/Carcinogenicity/Rat (83-5): MRID# 426801-32

NC-129 was administered in the diet to groups of Wistar rats for 104 weeks at doses of 0, 4, 10, 28 or 80 ppm to assess carcinogenicity. Additional groups received doses of 0, 4, 10, 28 or 120 ppm for 104 weeks (with an interim sacrifice at 53 weeks) to assess chronic toxicity. Decreased body weight and body weight gain of >10% were seen in males and females in the high dose group in both the chronic toxicity and carcinogenicity phases. Decreased serum ALT was seen in male rats in the 120 ppm dose group in the chronic toxicity phase. There was no treatment-related neoplastic or non-neoplastic pathology in either phases of the study.

NOEL = 28 ppm in males (1.13 mg/kg/day) and 28 ppm (1.46 mg/kg/day) in females
LOEL = 120 ppm (5.00 mg/kg/day) in males and 120 ppm (6.52 mg/kg/day) in females based on decreased body weight gain in males and females and decreased ALT levels in males in the chronic toxicity phase
MTD = 80 ppm (3.18 mg/kg/day) in males and 80 ppm (4.23 mg/kg/day) in females based on decreased body weight gain from weeks 0-13 in the carcinogenicity phase

Classification: Minimum

D. Developmental Toxicity

Developmental Toxicity/Rat [83-3(a)]: MRID # 426801-39

NC-129 was administered to female Sprague-Dawley rats from days 6 through 15 of gestation at dosages of 0, 2.5, 5.7, 13.0 or 30.0

mg/kg/day. Maternal toxicity was evidenced by decreased body weight/body weight gain and food consumption in the 13 and 30 mg/kg/day groups. Developmental toxicity was evidenced by decreased fetal body weight and incomplete ossification in selected bones in the 30 mg/kg/day group.

Maternal NOEL = 4.7 mg/kg/day (82% of 5.7 mg/kg/day); Maternal LOEL = 13.0 mg/kg/day based on decreased body weight/weight gain and food consumption during the dosing period.
Developmental NOEL = 13.0 mg/kg/day; Developmental LOEL = 30 mg/kg/day based on decreased fetal body weight and increased incomplete ossification in selected bones.

Classification: Minimum

Developmental Toxicity/Rabbit [83-3(b)]: MRID #'s: 426801-40 (tolerance study), 426801-41 (range-finding study) and 426801-42 (main study)

NC-129 was administered to female New Zealand White rabbits from days 6 through 19 of gestation at dosages of 0, 1.5, 5 or 15 mg/kg/day. Maternal toxicity was evidenced by a dose-dependent decrease in body weight gain and food consumption at all dose levels. There was also an increased incidence of abortions and clinical signs (few feces) in the 15 mg/kg/day group. There was no evidence that the chemical had a developmental effect at any of the tested levels.

Maternal NOEL = < 1.5 mg/kg/day; Maternal LOEL = ≤ 1.5 mg/kg/day based on decreases in body weight gain and food consumption at all dose levels
Developmental NOEL = ≥ 15 mg/kg/day; Developmental LOEL = > 15 mg/kg/day

A developmental toxicity study (MRID# 436804-16) on NC-129 (99.7% a.i.) was performed in Himalayan rabbits in which the test compound was administered to groups of female pregnant rabbits (14-15/group) by dermal application at dose levels of 0, 70, 170, or 450 mg/kg/day from gestational days 6-19, inclusive.

Maternal toxicity, observed at 70 mg/kg/day, was manifested by moderate to severe skin reactions. At ≥170 mg/kg/day, there was body weight loss (≥14.2 g) and food consumption (≥24%) and moderate to severe skin reactions in 50% of the animals. In addition, the severity of skin reactions increased in a time- and dose-dependent manner. The maternal systemic NOEL was 70 mg/kg/day.

Developmental toxicity observed at 450 mg/kg/day (HDT) consisted of increase in the incidence of fetuses with incompletely ossified skull. The developmental NOEL was 170 mg/kg/day.

Maternal NOEL for dermal toxicity = not established
Maternal LOEL for dermal toxicity = 70 mg/kg/day, based on skin reactions.

Maternal NOEL for systemic toxicity = 70 mg/kg/day
Maternal LOEL for systemic toxicity = 170 mg/kg/day, body weight loss and decreased food consumption.

Developmental toxicity NOEL = 170 mg/kg/day
Developmental toxicity LOEL = 450 mg/kg/day, based on retarded growth of fetuses

The maternal findings were in general, similar to those seen in a range-finding study conducted by the performing laboratory; Study # 24R0751/90133; Title: Results of a range-finding prenatal toxicity study with NC-129 in Himalayan rabbits after dermal application; 1993.

This study is classified as **Acceptable** and **satisfies** the guideline requirement for a developmental toxicity study (§83-3b) in rabbits.

E. Reproductive Toxicity

Multigeneration Reproduction/Rat (83-4): MRID #'s 426801-43 (range-finding) and 426801-44 (main study)

In a standard two-generation reproduction study, CD rats were administered NC-129 in the diet at doses of 0, 10, 28 or 80 ppm. Parental/systemic toxicity was noted in the form of decreased body weights, body weight gains and food efficiency in the 80 ppm group males. The 80 ppm group females showed an occasional similar effect but not as pronounced. The 80 ppm group females had slightly decreased body weights and body weight gains during the lactation period. The 80 ppm group litters began to gain less weight from lactation day 14 on indicating that the offspring were affected by nursing. There was no effect on reproductive parameters at the dose levels tested.

Parental/Systemic NOEL = 28 ppm (2.20 and 2.41 mg/kg/day for males and females, respectively)
Parental/Systemic LOEL = 80 ppm (6.31 and 7.82 mg/kg/day for males and females, respectively) based on decreased body weights, body weight gains and food efficiency.
Reproductive NOEL = $\geq$ 80 ppm in males and females
Reproductive LOEL > 80 ppm in males and females

Classification: Guideline

F. Mutagenicity

Salmonella and *Escherichia coli*/mammalian activation gene mutation assay [84-2(a)]: MRID # 426801-45

In two independent experiments, NC-129 was not mutagenic in 4 strains of S. typhimurium and one strain of E. coli at concentrations up to 5000 µg/plate in the presence or absence of S9 activation.

Classification: Acceptable

In vitro gene mutation assay in mammalian cells/Chinese hamster V79 cells [84-2(a)]: MRID # 426801-49

NC-129 was negative for inducing forward gene mutations at the HGPRT locus in cultured Chinese hamster V79 cells at concentrations up to the limit of solubility (50 µg/ml) both with and without S9 activation.

Classification: Unacceptable

In vitro cytogenicity/Chinese hamster lung cells [84-2(b)]: MRID # 426801-48

NC-129 was negative at concentrations up to 50 µg/ml in a chromosome aberration assay using Chinese hamster lung cells both with and without S9 activation.

Classification: Acceptable

In vivo micronucleus assay/Mouse [84-2(b)]: MRID # 426801-47

NC-129 was negative for micronucleus induction in the bone marrow cells of ICR mice after oral gavage administration of doses up to 140 mg/kg that produced mortality in both sexes.

Classification: Acceptable

DNA Damage/Repair/E. coli (84-4): MRID # 426801-46

NC-129 was negative for inducing primary DNA damage in E. coli repair deficient strains at concentrations up to 10,000 µg/ml both with and without S9 activation.

Classification: Acceptable

G. Neurotoxicity

In an acute neurotoxicity study (MRID # 436804-12), CD rats

(10/sex/group) received a single oral gavage administration of NC-129 in 1% aqueous carboxymethylcellulose at doses of 0 (vehicle only), 50, 100 and 200 mg/kg body weight (a.i. equivalents: 44.3, 79.6, and 190 mg/kg for males and 0, 44.5, 99.7, and 190 mg/kg body weight for females). The animals were observed for mortality and clinical signs of toxicity for 14 days post-dosing.

Compound-related decreases in body weight gain were noted in mid-dose males (17%) and females (36%) and high-dose males (74%); high-dose females lost weight (4 g) during first four days of the observation period. Food consumption was low in all treated groups on the day of dosing with severe effect in high-dose males (73%). A dose-dependent increase in clinical signs (piloerection, hypoactivity, tremors, and partially closed eyes) was seen in mid-dose males and high-dose males and females. These effects were reversible by observation Day 4. Treatment-related findings in the functional observational battery consisted of lower body temperature in high-dose males. Reduced motor activity (≥44%) was also noted among high-dose males. **No treatment-related gross or microscopic neuropathologic findings were present.**

NOEL for systemic toxicity = 50 mg/kg/day in both sexes
LOEL for systemic toxicity = 100 mg/kg in males and females based on the clinical signs of toxicity, and decreased food consumption and body weight gain.

Based on the findings of this study (screening battery), the LOEL for neurobehavioral effects was established at 200 mg/kg in males (FOB findings and motor activity); no LOEL was established for females (>HDT).

This study is classified as <u>acceptable</u> and <u>satisfies</u> the requirements (81-8) for an acute neurotoxicity study in rats.

In a subchronic neurotoxicity study (MRID # 43680413), NC-129 (98%) was administered to CD rats (10/sex/group) at dietary levels of 0, 30, 100, and 350 ppm (0, 2.5, 8.5 and 28.8 mg/kg/day in males and 0, 2.8, 9.3 and 31.1 mg/kg/day in females, respectively) for 13 weeks. Clinical observations, body weights, functional observation battery, and motor activity data were collected. Neuropathological evaluations were performed on 5 rats/sex/group. The remaining animals were subjected to gross- and histopathological examinations.

Treatment-related effects in high-dose males and females included decreases in body weight (≥74% of control) and body weight gain (≥59% of control) which were accompanied by decreases in food consumption and food efficiency. Clinical observations included piloerection and hunched posture in males and females at 350 ppm.

No neuropathological effects were observed.

Based on the findings of this study (decreases in body weight, body weight gain, food consumption and food efficiency), the LOEL was established at 350 ppm (28.8 mg/kg/day in males and 31.1 mg/kg/day in females). The NOEL was established at 100 ppm (8.5 mg/kg/day in males and 9.3 mg/kg/day in females.

VI. DOSE RESPONSE ASSESSMENT

A. Reference Dose

The EPA Health Effects Division (HED)-RfD/Peer Review Committee met on August 17, 1995, to reconsider the RfD value for Pyridaben (98% a.i.). The RfD is based on a the same chronic dog study (MRID# 426801-35) with a threshold LOEL of 0.5 mg/kg/day for clinical signs of toxicity and an uncertainty factor of 100. The Committee recommended a change in the RfD value from 0.002 mg/kg/day to 0.005 mg/kg/day. In the process of the weight of the evidence determination, the Committee took into consideration the frequency and severity of the effects, and the consistency of observations in several studies with pyridaben. The Committee noted that the diarrhea exhibited a flat response pattern until late in the study. The excessive salivation exhibited a more consistent pattern throughout the study. However, the Committee questioned the biological significance of this effect. Body weight gain reduction was evident in the 1 mg/kg/day dose level. A NOEL for body weight gain reduction was considered to be 0.5 mg/kg/day. The Committee, therefore, recommended that the additional uncertainty factor of 3, previously applied by the Committee in the calculation of the RfD for this chemical, be deleted. Consequently, the new RfD was based on the same long-term toxicity study in dogs with a threshold LOEL of 0.5 mg/kg/day. An uncertainty factor of 100 was applied to account for both the interspecies extrapolation and intraspecies variability. On this basis, the RfD was calculated to be 0.005 mg/kg/day.

B. Carcinogenicity Classification

Based on the available data the chemical has been classified as a "Group E" carcinogen (RfD/Peer Review Committee meeting, 5/11/94). The results of five mutagenicity studies were negative.

C. Other Toxicity Endpoints

Dermal Absorption

% Absorbed: Estimate of 1.3%. No dermal absorption data are available. However, based upon a comparison of the maternal LOEL of 13 mg/kg/day in a developmental toxicity study in rats (MRID 42680139) and the systemic LOEL of 1000 mg/kg/day in a 21-day dermal toxicity study in rats (MRID 42680130), an estimate of dermal absorption of 1.3% should be used.

Acute Dietary Endpoint (One Day)

Study Selected: Guideline No.: Acute oral neurotoxicity in rats (81-8) (MRID: 43680412). Summary: NC-129 (Pyridaben) was administered in 1% carboxymethylcellulose once orally at doses of 0, 50, 100 and 200 mg/kg body weight. NOEL for systemic toxicity = 50 mg/kg/day for both sexes; LOEL = 100 mg/kg/day in both sexes based on clinical signs of toxicity, decrease in food consumption and body weight gain. The LOEL for neurobehavioral effects = 200 mg/kg/day in males (FOB findings and reduced motor activity); the LOEL for females was >200 mg/kg. Since the NOEL for use in calculating the acute dietary assessment is from a neurotoxicity study, the use of all population subgroups is appropriate.

Dose and Endpoint: 50 mg/kg/day = NOEL for clinical signs of toxicity.
Comments about dose/study: Endpoint of toxicity identified in the acute neurotoxicity study was clinical signs consisting of hypoactivity, tremors, piloerection, and partially closed eyes. These effects were seen at 100 mg/kg/day and above. The NOEL was 50 mg/kg/day. These effects are anticipated to occur following a single oral exposure.

Short- (1-7 days, Non-Cancer) AND Intermediate- (7 days to several months, Non-Cancer) Term Occupational or Residential Exposure

In a 21-day dermal toxicity study, pyridaben when administered at 0, 30, 100, 300, or 1000 mg/kg/day, 6 hrs/day, 5 days/week for 21 days caused decreases in body weight gain at the limit dose (1000 mg/kg/day). However, these effects were observed at treatment levels high enough to preclude the likelihood that any exposure of concern would be likely to occur.

These risk assessments are NOT required.

Chronic Occupational or Residential Exposure (Several Months to Lifetime)

Study Selected: Guideline No.: One-year feeding studies in dogs (83-1b) (MRID No.: 42680134; 42680135). Summary: Pyridaben was

administered in capsules to male and female beagle dogs at dosages of 0, 1, 4, 16, and 32 mg/kg/day for one year (MRID No.: 42680134). In another study, male and female dogs were administered the test compound at dose levels of 0 and 0.5 mg/kg/day for one year. Increased incidences of clinical signs of toxicity (ptyalism and emesis) were seen in all treated groups. Body weight gain reduction was evident in the 1 mg/kg/day dose level (MRID No.: 42680134). A NOEL for systemic toxicity (body weight gain reduction) was 0.5 mg/kg/day (MRID No.: 42680135). Based on the reevaluation of data and the weight of evidence, the threshold LOEL for clinical signs of toxicity was 0.5 mg/kg/day.

Dose and Endpoint:: LOEL = 0.5 mg/kg/day for clinical signs of toxicity.

Comments about dose/study and/or endpoint: This is the study that was used to derive the RfD. Since a LOEL from an oral study was used an absorption rate of 1.3% should be used.

VII. DIETARY EXPOSURE AND RISK CHARACTERIZATION

A. Dietary Exposure From Food Sources

i. Plant Metabolism: BASF has submitted metabolism studies for oranges and apples.

Oranges: BASF Corp. submitted data from a [^{14}C]pyridaben metabolism study on oranges (MRID# 432589-02). [^{14}C]Pyridaben was labeled in either the benzyl [^{14}C-Bz] or pyridazinone [^{14}C-Pz] ring. Hamlin and Valencia oranges were treated twice at a high (4.25 lb ai/A/application) or low (0.51 lb ai/A/application) rate with each of the labeled pyridaben test substances formulated as a 20% WP. The high rate represents an 8.5x exaggerated rate and the low rate represents a 1x rate. Oranges were collected at various posttreatment intervals (PTIs) following the first and second applications. Each sample was comprised of an individual orange.

For low dose oranges treated with either radiolabelled compound, 51.4-78.7% of the TRR was identified or characterized. Solid fractions containing unextracted ^{14}C-residues accounted for 10.7-28.8% of the TRR, but each fraction contained <0.013 ppm. For high dose oranges treated with either radioisotope, 68.7-79.8% of the TRR was identified or characterized. Radioactive residues remaining in solid fractions accounted for <13.4% of the TRR and <0.064 ppm.

For both orange varieties treated with either radiolabelled compound, the majority of the identified radioactivity was

comprised of the parent accounting for 12.6-23.2% of the TRR (0.007-0.022 ppm) in low dose fruit and 24.6-36.3% of the TRR (0.092-0.264 ppm) in high dose fruit. In each case, the majority of pyridaben was recovered in the surface wash, with a small portion (0.2-1.9% TRR) of the parent detected in the MeOH:H_2O peel extract. Each of the other identified metabolites accounted for <4.6% TRR and <0.018 ppm. Metabolites identified in ^{14}C-Bz treated oranges included PB-11, PB-14, PB-22, B1, and B-3. Metabolites identified in ^{14}C-Pz treated fruit included P-14, PB-7, PB-11, PB-14, and PB-22. Several unknowns were detected, including nonpolar, intermediately polar, and polar spots on TLC plates. However, no one unknown or TLC spot accounted for >4.8% TRR or >0.027 ppm in any one sample.

The petitioner has proposed that the metabolism of pyridaben is similar in oranges and apples (see below) involving primarily photochemical, hydrolytic, and oxidative reactions. The principal metabolic pathway apparently involves the photo-induced rearrangement of the parent, in which the benzyl group is substituted for the chlorine on the pyridazinone ring to form a thioalcohol. The other metabolic pathways involve the oxidation of the tertiary butyl groups or the hydrolytic cleavage and subsequent oxidation of the benzyl and pyridazinone moieties. Metabolites identified in oranges are shown in Figure 1.

Apples: BASF Corp. submitted data from a [^{14}C]pyridaben metabolism study on apples (MRID# 432876-01). [^{14}C]Pyridaben was labeled in either the benzyl [^{14}C-Bz] or pyridazinone [^{14}C-Pz] ring. Apple trees were sprayed three times at intervals of 28 and 34 days with [phenyl-U-^{14}C]pyridaben at 300 g ai/ha (1x the proposed rate). Apples were collected 25 days following the final application. To obtain residue levels high enough for metabolite identification, individual apples were also painted with a solution of [phenyl-U-^{14}C] or [pyridazinone-3,6-^{14}C]pyridaben at 1 mg/apple, ~40x the proposed rate, and collected after 40 days.

The parent compound pyridaben was found in all soluble fractions, although primarily in dichloromethane (DCM)-soluble fractions, and was the predominant residue, accounting for 20.8% of the TRR in apples from the 1x spray treatment and ~50% in apples from the "paint" treatments. Data from the [^{14}C-Bz]pyridaben treated apples indicate that the following benzene ring metabolites were formed from a thioalcohol intermediate after cleavage of the two rings: the carboxylic acid metabolite B-1, the alcohol metabolite B-3, and the aldehyde metabolite B-5. Metabolite D-1, a photo-dimer, was detected at 0.8% of the TRR in the 40x [^{14}C-Bz] treated apple peel. The only Pz-ring metabolite identified in [^{14}C-Pz]pyridaben treated apples was P-2. Three double-ring metabolites, PB-14, PB-17, and PB-22, were detected in all samples. None of the metabolites identified accounted for more than 6% of the TRR. Several unidentified non-polar,

intermediately polar, and polar HPLC peaks were isolated, containing up to 0.125 ppm; however, none of these components exceeded 7% of the TRR.

Small proportions of the TRR (0.3%, 0.016 ppm), PB-22 (0.28%, 0.013 ppm), and PB-14 (0.1%, 0.007 ppm) were released from the insoluble fraction of [^{14}C-Pz] treated peel by MeOH Soxhlet extraction and subsequent digestion with α-amylase.

Radioactive cellulose, starch, and lignin were characterized in the nonextracted fractions of 1x spray treated apples ([^{14}C-Bz]) and 40x painted apples ([^{14}C-Pz]), accounting for 17-18% of the TRR.

The petitioner has proposed that the metabolism of pyridaben in apples involves primarily photochemical, hydrolytic, and oxidative reactions. The principal metabolic pathway apparently involves the photo-induced rearrangement of the parent, in which the benzyl group is substituted for the chlorine on the pyridazinone ring to form a thioalcohol. The petitioner theorizes that exposure to sunlight causes formation of a delocalized n-π* excited state diradical and a partial carbon-to-carbon bond that weakens the carbon-chloride and carbon-sulfur bonds. The photo-rearrangement product (PB-15) then forms after collapse of the proposed transition state and is either reduced to PB-17 or further oxidized to the D-1 dimer, PB-14, and PB-22. The other metabolic pathways involve the oxidation of the tertiary butyl groups or the hydrolytic cleavage and subsequent oxidation of the benzyl and pyridazinone moieties. Metabolites identified in apples are shown in Figure 1.

Determination of the HED Metabolism Committee: It was concluded by the HED Metabolism Committee that the tolerance expression for plant commodities will include pyridaben only and that all organosoluble residues may be presumed to be of comparable toxicity to the parent. Thus, the risk assessment for human dietary consumption of pyridaben treated plant commodities will include all organosoluble residues. HED has calculated a ratio of pyridaben to organosoluble residues (2.3) based upon the low dose pyridaben apple and orange metabolism studies. These studies were chosen because they approximate the proposed use of pyridaben on citrus and apples. For DRES analysis, tolerance levels of pyridaben in/on plant commodities will be multiplied by the ratio of organosoluble residues to pyridaben (2.3).

ii. Animal Metabolism: BASF has submitted metabolism studies for lactating goats and laying hens. Poultry feed items are not associated with the proposed uses of pyridaben on citrus, apples, almonds, pears, peaches, plums and grapes. Thus, the data concerning the metabolism of pyridaben in poultry are

informational. Ruminant feed items are associated with citrus, apples, and almonds. Thus, the metabolism of pyridaben in ruminants is of concern.

Ruminants: BASF Corp. submitted data depicting the metabolism of [^{14}C]pyridaben in lactating goats (MRID# 432589-18). Goats were dosed with [^{14}C]pyridaben radiolabeled either uniformly in the benzyl ring (^{14}C-Bz) or at the 3 and 6 positions of the pyridazinone ring (^{14}C-Pz). Four goats were orally dosed for 5 consecutive days with either [^{14}C-Pz]pyridaben or [^{14}C-Bz]pyridaben at a low (0.2 mg/day) or high (20 mg/day) dose. Based upon actual feed consumption, the administered doses were equivalent to average dietary levels of 0.20 ppm for both low dose goats and 7.8 and 6.9 ppm for the high dose goats fed [^{14}C-Pz]pyridaben and [^{14}C-Bz]pyridaben, respectively. Based upon a diet consisting of wet apple pomace, dried citrus pulp and almond hulls, the calculated maximum theoretical dietary exposure of beef and dairy cattle to pyridaben residues would be 1.8 and 1.3 ppm, respectively. The high dose (7.8 ppm) represents an exaggerated feeding level of 4.4x and 6.2x for beef and dairy cattle, respectively.

During the dosing period, milk samples were collected twice a day, prior to dosing in the morning (am) and again in the evening (pm). Urine and feces were collected daily and cage wash samples were collected at the end of the dosing period. Goats were sacrificed within 24 hours of administering the final dose, and samples of liver, kidney, muscle (triceps, gracilis, and longissimus dorsi), and fat (perirenal, mesenteric, and subcutaneous) were collected. Samples of bile and the gastrointestinal (GI) contents were also collected to determine the total recovery of the dosed radioactivity.

Levels of radioactivity were higher in goats receiving [^{14}C-Pz]pyridaben than in goats dosed with [^{14}C-Bz]pyridaben. For the high dose goats (Pz and Bz), radioactive residues in milk reach a maximum (0.003-0.009 μg/ml) on the afternoon following administration of the second dose. In tissues, ^{14}C-residues were highest in liver (0.106-0.139 ppm), followed by fat (0.026-0.059 ppm), kidney (0.019-0.034 ppm), and muscle (0.005-0.009 ppm).

For the goat treated with [^{14}C-Pz]pyridaben at 6.9 ppm, pyridaben (17.6% TRR), PB-9 (5.1% TRR), and PB-7 (3.8% TRR) were identified in the organosoluble liver ^{14}C-residues by HPLC and confirmed by TLC. The metabolites PB-1 and PB-13 were also tentatively identified in liver by TLC. TLC analysis of kidney detected PB-11 (58.1% TRR), but its identity was not confirmed. TLC analysis of organosoluble residues from muscle did not identify any metabolites and each isolated component accounted for $\leq$0.005 ppm. In fat, TLC analysis tentatively identified PB-9 and PB-12 but their identities were also not confirmed. Due to

low TRR levels in milk, residues were characterized as organosoluble (64.9%, 0.003 ppm) or aqueous soluble (34.1%, 0.002 ppm), but were not identified.

For the [^{14}C-Bz]pyridaben treated goat, HPLC analysis of organosoluble liver ^{14}C-residues identified pyridaben (6.5% TRR) and PB-7 (7.9% TRR). Their identities were confirmed by 1D-TLC analysis, which also detected the presence of PB-9. Other metabolites that were tentatively identified by 1D-TLC analyses included PB-11 and PB-13 in liver and B-7 in kidney. No metabolites were identified in either muscle or fat, and each isolated component contained <0.01 ppm of radioactivity. Due to low TRR levels in milk, residues were characterized as organosoluble (81.4%, 0.002 ppm) or aqueous soluble (18.6%, <0.001 ppm), but were not identified.

Although 1D-TLC analyses of organosoluble ^{14}C-residues in urine were inconclusive, 2D-TLC analyses identified PB-7 in urine of the Pz-treated goat and B-7, B-8 and B-11 in urine of the Bz-treated goat. 2D-TLC analyses of feces from both ^{14}C-Pz and ^{14}C-Bz treated goats indicated that pyridaben was the major component of the organosoluble residues in feces. In addition, 2D-TLC identified PB-7, PB-9, and PB-13 in feces from the Pz-treated goat, and PB-7 and PB-9 in feces from the Bz-treated goat.

Based upon these data, the petitioner has proposed that the metabolism of pyridaben in goats involves the hydroxylation of one or both of the tertiary butyl groups followed by oxidation of the hydroxyl group(s) to an acid. Data from urine and feces also suggests that some cleavage of the molecule occurs. Metabolites identified in goat matrices are shown in Figure 1.

Determination of the HED Metabolism Committee: It was concluded by the HED Metabolism Committee that the tolerance expression for ruminant commodities will include pyridaben and its metabolites PB-7 and PB-9 and that all organosoluble residues may be presumed to be of comparable toxicity to the parent. Thus, the risk assessment for human consumption of ruminant commodities will also include all organosoluble residues. For liver, HED will calculate a ratio of pyridaben, PB-7 and PB-9 residues to organosoluble residues based upon the ruminant metabolism study. For milk and other tissues, best estimates of residues of concern for risk assessment may need to be based on total organosoluble residues in the goat metabolism study.

Poultry: BASF Corporation submitted data from a preliminary study (MRID# 432589-03) and a final study (MRID# 432589-19) depicting the metabolism of [^{14}C]pyridaben in laying hens. In both studies, hens were dosed with [^{14}C]pyridaben radiolabeled either uniformly in the benzyl ring (^{14}C-Bz) or at the C-3 and C-6

positions of the pyridazinone ring (^{14}C-Pz). In the preliminary study, four pairs of laying hens were orally dosed for 8 consecutive days with either [^{14}C-Pz]pyridaben or [^{14}C-Bz]pyridaben at a low (12.5 µg/day) or high (1 mg/day) dose. The dose level was not reported in terms of dietary exposure (µg/g feed or ppm) and feed consumption data were not reported.

In the final study, four groups consisting of ten hens per group were orally dosed for 8 consecutive days with either [^{14}C-Pz]pyridaben or [^{14}C-Bz]pyridaben at a low (12.5 µg/day) or high (1 mg/day) dose. A fifth group of ten hens was used as a control. Doses were administered by capsule daily. Based upon feed consumption data, the doses were equivalent to pyridaben dietary levels of approximately 0.1 ppm for the low dose and 7.5-7.9 ppm for the high dose. Dietary exposure of poultry to pyridaben residues is not expected as a result of the proposed uses.

For the [^{14}C-Pz]pyridaben treated hens, TLC analyses of organosoluble residues from breast muscle, fat, skin and eggs did not identify any possible metabolites and each isolated unknown component amounted to ≤0.006 ppm. In thigh muscle, a dihydroxy metabolite, PB-13, was tentatively identified at a level of 0.001 ppm. HPLC analysis of organosoluble ^{14}C-residues in ^{14}C-Pz liver identified the acid metabolite PB-7 (18.3% TRR; 0.022 ppm) as the principal residue in liver and minor amounts of a hydroxy metabolite, PB-9 (1.8% TRR; 0.002 ppm), were also detected. The identities of PB-7 and PB-9 were confirmed by TLC analysis.

For the [^{14}C-Bz]pyridaben treated hens, TLC analyses of organosoluble residues from muscle, fat, skin and eggs did not identify any component amounting to >0.01 ppm. The metabolite PB-11 (21.8% TRR; 0.006 ppm) was tentatively identified in fat by 1D-TLC analysis, and pyridaben, PB-7 and PB-9 were detected but not quantified in fat and skin by 2D-TLC analysis. In liver, the acid metabolite PB-7 (31.5% TRR; 0.028 ppm) was identified by HPLC analysis and confirmed by TLC analysis. The metabolite PB-9 was also detected in liver by 2D-TLC analysis but was not quantified.

Although no quantitative data were presented, 2D-TLC analyses of excreta from both ^{14}C-Pz and ^{14}C-Bz treated hens indicate that pyridaben was the major component of the organosoluble residues in excreta. These analyses also detected PB-7, PB-9, and PB-13 in excreta from ^{14}C-Pz treated hens and PB-7, B-7, B-11, and B-15 in excreta from ^{14}C-Bz treated hens.

Based upon the above data, the petitioner proposed that the metabolism of pyridaben in hens is similar to the metabolism in goats and involves the hydroxylation of one or both of the tertiary butyl groups followed by oxidation of the hydroxyl group(s) to an acid. Metabolites identified in poultry matrices are shown in Figure 1.

Figure 1. Pyridaben and its metabolites in plants and animals.

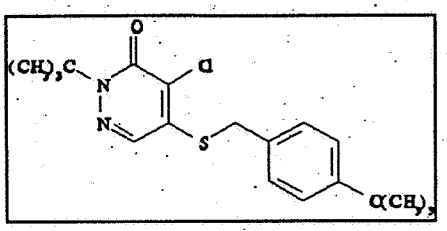
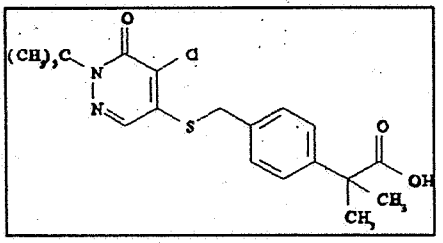
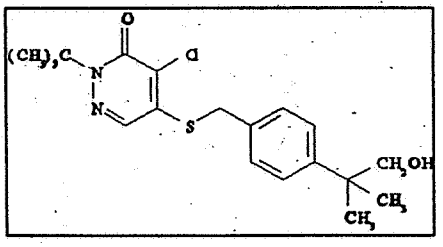
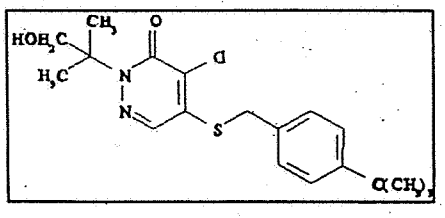
Common Name Chemical Name	Structure	Substrate
Pyridaben (PB-1) 2-tert-butyl-5-(4-tert-butylbenzylthio)-4-chloropyridazin-3(2H)-one		Apple Orange Goat liver Poultry fat, skin, and excreta
PB-7 2-tert-butyl-5-[4-(1-carboxy-1-methylethyl)benzylthio]-4-chloropyridazin-3(2H)-one		Orange (tentative) Goat liver Poultry liver, fat, and skin
PB-9 2-tert-butyl-4-chloro-5-[4-(1,1-dimethyl-2-hydroxyethyl)-benzylthio]-chloropyridazin-3(2H)-one		Goat liver Poultry liver, fat, and skin
PB-11 5-(4-tert-butylbenzylthio)-4-chloro-2-(1,1-dimethyl-2-hydroxyethyl)pyridazin-3(2H)-one		Orange Poultry fat (tentative)

Figure 1. Continued.

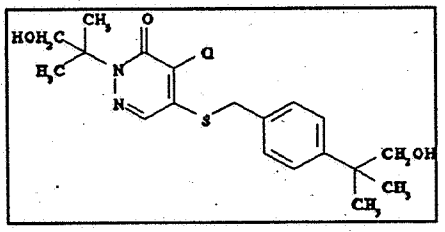
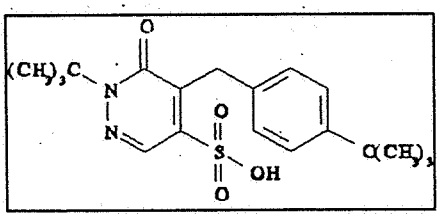
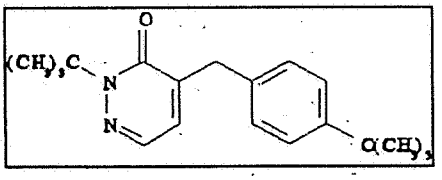
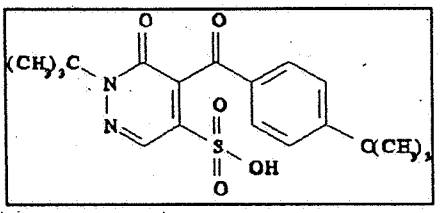
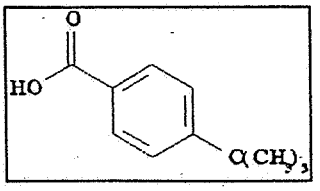
Common Name Chemical Name	Structure	Substrate
PB-13 4-chloro-2-(1,1-dimethyl-2-hydroxy-ethyl)-5-[4-(1,1-dimethyl-2-hydroxy-ethyl)benzylthio]-pyridazin-3(2H)-one		Poultry muscle and excreta (tentative)
PB-14 2-tert-butyl-4-(4-tert-butylbenzyl)-5-mercapto-pyridazin-3(2H)-one		Apple Orange
PB-17 2-tert-butyl-4-(4-tert-butylbenzyl)-pyridazin-3(2H)-one		Apple
PB-22 2-tert-butyl-4-(4-tert-butylbenzoyl)pyridazin-3(2H)-one-5-sulfonic acid		Apple Orange
B-1 4-tert-butyl-benzoic acid		Apple Orange (tentative)

Figure 1. Continued.

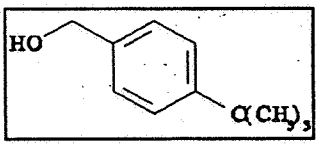
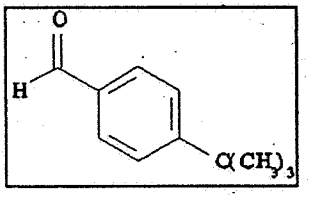
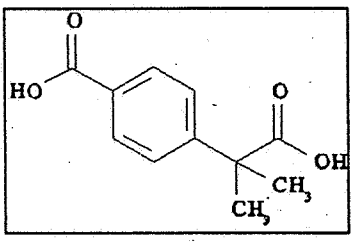
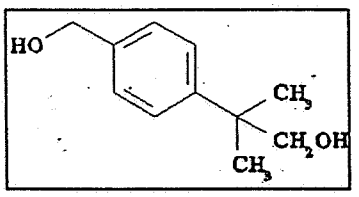
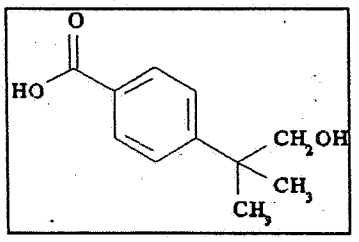
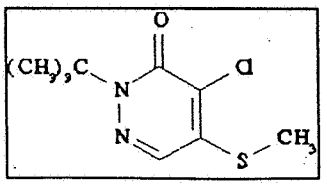
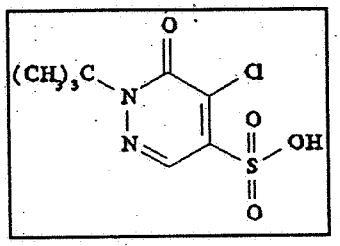
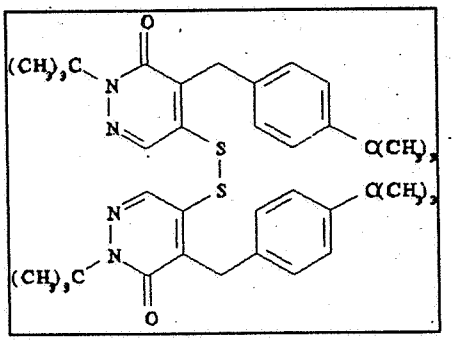
Common Name Chemical Name	Structure	Substrate
B-3 4-tert-butylbenzylalcohol		Apple Orange (tentative)
B-5 4-tert-butylbenzaldehyde		Apple
B-7 2-(4-carobxyphenyl)-2-methylpropionic acid		Poultry excreta
B-8 2-(4-hydroxymethylphenyl)-2-methyl-1-propanol		
B-11 2-(4-carboxyphenyl)-2-methyl-1-propanol		Orange Poultry excreta (tentative)
P-2 2-tert-butyl-4-chloro-5-methylthiopyridazin-3(2H)-one		Apple

Figure 1. Continued.

Common Name Chemical Name	Structure	Substrate
P-14 2-tert-butyl-4-chloropyridazin-3(2H)-one-sulfonic acid		Orange
D-1 Di[2-tert-butyl-4-(4-tert-butylbenzyl)-pyridazin-3(2H)-one-5-yl]disulfide		Apple

iii. Residue Analytical Method - Plants:

Apples, Pears, Peaches, Almonds, Plums and Grapes (BASF Method D9312A; MRID No. 442062-01): For solid samples, residues of pyridaben are extracted by blending the sample with a solution of acetone/water (8:2 v/v). For juice, residues are extracted by mixing the sample with 80% acetone/water (v/v). Following filtration to remove the sample material, the solvent is exchanged to water and an aliquot of the extract is applied to a mini-C_{18} silica gel column. Residues are eluted with 80% methanol/water (v/v) and the solvent is exchanged to toluene for analysis. Residues of pyridaben are quantified by analysis of the sample extracts by gas chromatography (GLC) utilizing an electron capture detector (^{63}Ni - ECD) and a fused silica column. The method has been validated to a quantification limit of 0.05 ppm. This method has been independently validated for use with apple and pear commodities as per PR Notice 88-5.

BASF Method D9312 has been adequately validated in both apples and almonds by BEAD. HED concludes that the submitted method (BASF Method D9312A) is adequate for the enforcement of the proposed time-limited tolerances for residues of pyridaben

in/on apples, pears and almonds. However, HED concludes that BASF Method D9312A is not adequate for the establishment of permanent tolerances for residues of pyridaben in/on apples, pears and almonds. The petitioner has not addressed previously cited method deficiencies. These deficiencies are as follows: BEAD noted the confirmatory technique (Section 3.5 of D9312A) specifies the use of an MSD monitoring two ions. BEAD and HED would prefer monitoring of a minimum of three ions for confirmation of residues. In our review of the validation of BASF Method D9312 for use with almonds, HED noted that BEAD (and the lab performing the independent validation of the method) did not utilize log of peak height versus amount of standard injected to obtain a straight line as specified in the method. HED prefers the calibration curve to not utilize log transformations. The method should be revised to reflect these views. Additionally, all recovery data presented in the method report should be recalculated without log transformations. The petitioner should revise BASF Method D9312A to address these deficiencies. HED recommends that these be made a condition of the registration of pyridaben for use on apples, pears and almonds. Once the revised method is submitted and judged adequate, it will be forwarded to the FDA for inclusion in the Pesticide Analytical Manual (PAM) Vol. II.

Prior to the establishment of time-limited tolerances for residues in peaches, plums, and grapes; the petitioner should provide fortification recovery data for pyridaben from these crops by BASF Method D9312A.

Citrus (BASF Method D9309A; MRID No. 440859-01): BASF Method D9309A is briefly described as follows: whole fruit are homogenized and then blended with acetone:water. Sodium chloride is added to the extract and the residues are partitioned into dichloromethane, dried by evaporation, dissolved in DCM:hexane (3:7, v/v) and cleaned up on a silica gel column eluted with DCM:hexane (11:9, v/v). The samples are then dried, dissolved in toluene, and analyzed by GC/ECD. This method has been independently validated for use with citrus commodities as per PR Notice 88-5.

BASF Method D9309 has been adequately validated for use in oranges by ACL/BEAD. Not all of BEAD's comments were incorporated into the revised method (D9309A). The petitioner did not adequately address comments concerning the activation temperature of the florisil utilized in the method and comments concerning instrument calibration procedures. To address these comments, the petitioner is instructed to revise BASF Method D9309A such that the method indicates that the activation of the florisil should be conducted as specified by BEAD and that the calibration of the instrument is to be performed without log transformations. All recovery data previously reported in the method should be recalculated to note this change in calibration

procedures.

This method is adequate for enforcement of the proposed time-limited tolerances for residues of pyridaben in/on orange commodities. HED recommends that the submission of a revised BASF Method D9309A be made a condition of the establishment of permanent tolerances for residues in/on citrus and ruminant commodities.

iv. Residue Analytical Method - Animals: BASF Method D9405 for animal matrices (MRID# 436804-36).

BASF Method D9405 is briefly described as follows: macerate animal tissue with acetone/water and milk with acetone. Filter and wash the sample with the same solvent. Methylate a portion of the extract with diazomethane. After adding water, load the methylated sample onto a octadecylsilane column and elute with methanol /water. The sample is then evaporated to dryness, dissolved in acetonitrile and analyzed by GC/ECD. This method has been independently validated for use with milk and liver commodities as per PR Notice 88-5.

BASF Method D9405 has been validated in both liver and milk by BEAD. HED concludes that BASF Method D9405 (MRID No. 436804-36) is adequate for enforcement of proposed time-limited tolerances for residues of pyridaben and its metabolites PB-7 and PB-9 in ruminant commodities. HED recommends that addressing deficiencies of BASF Method D9405 be made a condition of the establishment of permanent tolerances for residues of pyridaben and its metabolites in ruminant commodities. The petitioner will need to specifically address deficiencies concerning the use of diazomethane, log transformations, column cleanup procedures and the method flow diagram as originally cited in our review of 11/21/96 (Memo, W.D. Wassell, 11/21/96, PP#5F4543, D231131).

Prior to the establishment of permanent tolerances, HED concludes an additional quantity of each standard (pyridaben metabolites PB-7, PB-9 and PB-7 methyl) are required. The petitioner should submit to the EPA Pesticides Repository in RTP, NC a minimum of 2 grams each of analytical reference grade pyridaben metabolites PB-7, PB-9 and PB-7 methyl. Once this has been done, the petitioner should submit to HED proof of submission of the reference standard. HED will accept as proof of submission a letter from the repository acknowledging receipt of the subject standards.

v. Storage Stability

Apples: Data pertaining to the stability of pyridaben residues in or on apple and apple pomace (dry) were submitted

(MRID# 432876-06). Samples from the 1993 field trials were analyzed within 10 months of harvest, while samples from the 1994 field trials and the apple processing study were analyzed within 5 months. The submitted data pertain to the stability of pyridaben residues in apple and dry apple pomace for storage intervals of approximately 1, 3, 6, and 13 months at <-5°C. The petitioner indicates the study is on going and will include storage intervals of 18 and 24 months.

For purposes of time-limited tolerances only, HED concludes pyridaben residues in whole apples appear to degrade by an approximate 30% during frozen storage. Time-limited tolerance levels were corrected for this degradation. We will translate this data to wet pomace and juice. For purposes of the establishment of permanent tolerances, the additional data for the 18 and 24 month storage intervals must be submitted.

Almonds: In conjunction with the magnitude of residue studies, the petitioner reports the results of an ongoing storage stability study for pyridaben in/on almond RACs during frozen storage for a period of 6 months. Samples from the submitted almond field trials were analyzed within approximately 13 months of harvest. The submitted data pertain to the stability of pyridaben residues in almond nutmeat and hulls for storage intervals of approximately 0, 1, 3 and 6 months at <-5°C. All recovery samples were fortified with pyridaben at 1.0 ppm. The petitioner indicates the study is on going and will include storage intervals of 12 and 24 months.

HED concludes pyridaben in/on almond nutmeat and hulls appears to be stable for a period of approximately 6 months when stored frozen. As samples were stored for a maximum of approximately 13 months from harvest to analysis and pyridaben has been shown to degrade upon frozen storage in apples, citrus (^{14}C-pyridaben) and certain livestock commodities, HED concludes additional storage stability data are required to assess the stability of pyridaben in/on almond nutmeat and hulls upon frozen storage. The petitioner should submit the results of the 12 and 24 month intervals of the ongoing study.

Pears: The petitioner has previously submitted data pertaining to the stability of residues of pyridaben in/on apples during frozen storage for a period of 13 months. HED will translate these data to pears. Samples from the submitted pear field trials were analyzed within 6 months of harvest. Based on the degradation of residues observed in the apple study, pyridaben residue data for pears were corrected for an approximate 30% degradation during frozen storage prior to analysis. When the additional data are submitted, HED will reevaluate our conclusions concerning degradation of residues of pyridaben during frozen storage.

Citrus: Storage stability data on pyridaben in/on oranges and orange processed commodities have been submitted (MRID# 432589-15). Samples of oranges, dried orange pulp, orange molasses, and orange oil were fortified with 1 ppm with pyridaben and were stored frozen for 12 months. Samples of each matrix were analyzed using BASF Method D9309 at 0-time and 1, 3, 6, and 12 months. The results indicate that pyridaben is stable for up to 12 months on oranges and orange processed commodities. The requirement for storage stability data in/on citrus is fulfilled.

Peaches and Grapes: BASF (MRIDs 43258908 and 43258909) submitted data pertaining to the storage stability of pyridaben residues in peaches, grapes, and grape processed commodities. Commercially obtained grapes, grape juice, raisins, wine, grape pomace, raisin waste, and peaches were homogenized and fortified at 1.0 ppm, then stored at -18 C. Samples were analyzed at time zero and after 3, 6, and 9 months of storage. The petitioner states that a second part of this study, not included in this submission, provides data from 12 and 24 month storage intervals. The submitted storage stability data for peaches and grape processed commodities (MRID Nos. 43258908 and 43258909) indicate that pyridaben residues are stable in peaches, grape wet pomace, grape dried pomace, wine, raisins, and raisin waste samples stored at -18 C for up to 9 months (~274 days). Pyridaben residues appear to decline in grape juice by ~35% after 3 months of storage at -18 C and by ~50% after 9 months of storage at -18 C. Also, the petitioner has submitted additional information and data concerning the peach field trials. The data show that residues may have degraded approximately 25% between extraction and analysis. Extracts were held 60 days prior to analysis. Residue levels in the peach field trials were thus adjusted for degradation of residues during storage prior to analysis.

Meat and Milk (MRID# 440274-06): Residues of pyridaben and its metabolites (PB-7 and PB-9) in liver and milk are stable when stored frozen (<-5°C) for a period of 18 months. Residues of pyridaben metabolites (PB-7 and PB-9) in muscle are stable during frozen storage at <-5°C for a period of 18 months. Residues of pyridaben in muscle appear to degrade approximately 30% during frozen storage (<-5°C) over a period of 12 to 18 months.

As detectable residues (>0.05 ppm) were not found in muscle and residues of pyridaben and its metabolites (PB-7 and PB-9) are stable in liver and milk during frozen storage, HED concludes correction of the results of the previously submitted ruminant feeding study for degradation of residues prior to analysis is not required.

vi. Magnitude of the Residue - Meat and Milk (MRID# 436804-39)

Twelve lactating cows were administered pyridaben for 29 days. Three of the cows were controls. Three sets of cows were each given 2.5, 7.5, and 25 ppm pyridaben per day. Actual dose was calculated based on average feed consumption for the previous week. Milk samples were collected twice a day. Since the cows were dosed after the morning milking, the evening collection was pooled with the following morning's collection to create one aliquot. The samples were frozen and shipped to the testing facility on a weekly basis. Within five hours of the last dose, all the cows were sacrificed. Samples were obtained of liver, muscle, kidney, and fat.

Samples were analyzed using BASF Method 9405. No detectable residues were found in any sample from the 2.5 ppm treated cows. The metabolite PB-7 was found in the 7.5 and 25 ppm liver samples at 0.05 and 0.15 ppm respectively. PB-7 was also found at the 25 ppm feeding level in fat at 0.08 ppm. Pyridaben was found in a day 3 sample of milk at 0.03 ppm. HED concludes the submitted ruminant feeding study is adequate for tolerance setting purposes.

vii. Magnitude of the Residue - Crop Field Trials/Processed Commodities

Apples: Field residue studies were conducted in CA (2), MI, PA, NC, WA (2) and NY (2) during 1991 and in NY, MI and WA during 1994 in order to determine the residue levels of pyridaben resulting from the proposed use of the product on apples (MRID#s 437800-03 & -04). The field trials included the following apple varieties: Fuji, Granny Smith, Red Delicious, Empire, Top Red, Golden Delicious and Idared. Each trial consisted of one untreated plot and two treated plots. One of the treated plots received two applications of pyridaben at 0.5 lbs ai/A, while the other treated plot received three applications at 0.5 lbs ai/A. The interval between applications was 30 days. Treated fruit were harvested at intervals of 0, 5, 15, 25, and 30 days following the final application. The 25 day PHI samples represented normal crop maturity. The proposed use specifies two applications with a 30 day spray interval and a 25 day pre-harvest interval. The apple samples were analyzed according to BASF Method D9312, described above. The highest pyridaben residue level in apples was 0.44 ppm (WA). If HED assumes an approximate 30% degradation of residues due to the length and conditions of sample storage, then the residue data support a time-limited tolerance of 0.6 ppm for residues of pyridaben in/on apples.

In order to obtain apple samples containing detectable residues of pyridaben for a processing study, a field trial was performed in Washington at an exaggerated application rate (MRID# 437800-5). Applications were made on a thirty day interval and the final application was made on the day of harvest. The apples

were processed by a procedure intended to simulate commercial practices. The data indicate pyridaben residues do not concentrate in apple juice, however residues concentrate in wet pomace by a factor of 1.6x. From the field trials, the highest pyridaben residue level in apples was 0.44 ppm. If HED assumes an approximate 30% degradation of residues due to the length and conditions of sample storage and a 1.6x concentration into wet apple pomace, then the residue data support a time-limited tolerance of 1.0 ppm for residues of pyridaben in/on wet apple pomace.

For establishment of permanent tolerances for residues of pyridaben in/on apples, additional field trials will be needed from Regions II (1 trial), V (1 trial) and XI (2 trials) as specified in the Residue Chemistry Test Guidelines (860.1500).

Almonds: Eight field residue studies were conducted in California during 1994 in order to determine the residue levels of pyridaben resulting from the proposed use of the product on almonds (MRID# 440396-02). The field trials included the following almond varieties: Non Pareil (4 field trials), Carmel (2 field trials), Mission and Ne Plus. Each trial consisted of one untreated plot and one treated plot. The treated plots received two applications of pyridaben at 0.5 lbs ai/A. The interval between applications was 30 days. Treated samples were harvested 7 days following the final application. Two replicate samples were independently collected from each of the treated plots at sampling. The samples were analyzed according to BASF Method D9312, described above. Residue levels of pyridaben were below the method quantification limit (0.05 ppm) in all treated almond nutmeat samples. The maximum residue observed in almond hulls was 3.7 ppm. HED concludes the number and distribution of the almond residue field trials are adequate for tolerance setting purposes. We will withhold a final conclusion on the appropriate levels for permanent tolerances for pyridaben in/on almond nutmeat and hulls pending resolution of deficiencies associated with storage stability.

Pears: Field residue studies were conducted in NY, PA, CA (3), ID, WA and OR (2) during 1995 in order to determine the residue levels of pyridaben resulting from the proposed use of the product on pears (MRID# 440396-02). The field trials included the following pear varieties: Bartlett (6 field trials), BACA (1 field trial), Clapp's Favorite (1 field trial), D'Anjou (1 field trial). Each trial consisted of one untreated plot and one treated plot. The treated plots received two applications of pyridaben at 0.5 lbs ai/A. The interval between applications was 30 days. In all trials, treated fruit were harvested at intervals of 7 and 25 days following the final application. Two replicate samples were independently collected from each of the treated plots at sampling. The proposed PHI is 7 days. The Washington State field trial included samples collected at intervals of 0, 7, 15, 25 and 30 days following the

final treatment. The pear samples were analyzed according to BASF Method D9312, described above. The results of the analysis of treated samples from the proposed 7 day PHI show a maximum residue of 0.58 ppm. HED concludes the number and distribution of the pear residue field trials are adequate for tolerance setting purposes as per the Residue Chemistry Test Guidelines (860.1500). HED further concludes the submitted residue data support a tolerance level of 0.75 ppm for residues of pyridaben in/on pear. This tolerance level is based upon the highest residue level from the submitted field trials at a 7 day PHI (0.58 ppm) and an approximate 30% degradation of residues during storage.

Citrus: BASF has submitted nine orange, five grapefruit, and four lemon magnitude of residue studies (MRID#s 435189-01 thru -04). The lemon, grapefruit, and five of the orange studies included a control and four treated plots. Two of the treated plots received two or three applications at 30 day intervals with 0.25 lb ai/A (0.5x and 0.75x maximum use rate) and were sampled at seven days PHI. The other two treated areas received two or three applications at 90 day intervals with 0.50 lb ai/A (1x and 1.5x maximum use rate) and were sampled at 0, 1, 3, 7, and 10 days PHI. The remaining four orange studies were conducted using the lower application level, 0.25 lb ai/A, 30 day spray intervals, and were sampled at 0, 1, 3, 7, and 10 days PHI. Treated lemon samples had pyridaben residues ranging from 0.26-0.42 ppm in/on samples harvested 7 days following the last of two 0.5 lb ai/A foliar applications. The highest pyridaben residue, 0.77 ppm, was found on a 0 day PHI sample from an 2x 0.5 lb ai/A treatment area. The subsequent sampling on day 7 from the same treatment area showed residues of 0.35 ppm. Pyridaben residues were <0.05-0.24 ppm in/on grapefruit harvested 7 days following the last of two 0.5 lb ai/A applications. The highest pyridaben residue 0.43 ppm was found on a 0 day PHI sample from an 2x 0.5 lb ai/A treatment area. The subsequent sampling on day 7 from the same treatment area showed no detectable residues, <0.05 ppm. In oranges, the pyridaben residues for all the 0.25 lb ai/A applications ranged from <0.05 to 0.38 ppm. The highest residue found was on a 3x 0.5 lb ai/A, day one Florida sample at 1.03 ppm. The residues on samples from that treatment area sample declined to 0.17 ppm by day 7. The residues from the 0.5 lb ai/A applications show generally rapidly declining pyridaben residues. Pyridaben residues were <0.05-0.37 ppm in/on all the oranges harvested at 7 days PHI. HED concludes the submitted residue data support a time-limited tolerance level of 0.5 ppm for residues of pyridaben in/on citrus.

There are insufficient studies in EPA files on the representative commodities to establish a permanent tolerance for pyridaben on the citrus crop group. One lemon, one grapefruit, and four additional orange magnitude of residue studies, all in Florida, are necessary to establish a permanent pyridaben

tolerance in/on citrus. We will withhold a final conclusion on the appropriate levels for permanent tolerances for pyridaben in/on citrus commodities pending submission of these data.

Processing studies using pyridaben treated oranges have been submitted (MRID 432589-15). In order to assure the presence of pyridaben residues, three applications of pyridaben were made at 5 lb ai/A with 80 to 90 day intervals for a total of 15 lb ai/A. Samples were collected on the day of the last application. Following standard commercial practices, oranges were processed into molasses, wet and dried pulp, juice, and oil. The results of the study indicate that pyridaben residues concentrate 3.5x for dried pulp and 25.3x for oil. Pyridaben residues do not concentrate in wet pulp, molasses, or juice. HED concludes the submitted residue data support a time-limited tolerance level of 1.5 ppm for residues of pyridaben in/on dried citrus pulp and 10 ppm in citrus oil.

Peaches: Six field trials were conducted in Puangue (1), Penaflor (2), and Malloco (3), Chile depicting residues of pyridaben in/on five varieties of peaches (MRID 432589-10). Sites with more than one trial were side-by-side plots containing different varieties of peaches. For each trial site, one control plot was established. For each test plot, one application of the 1.67 lb/gal EC (1.65 lb/gal upon analysis) was made to peaches at 0.27 lb ai/A in 214-216 GPA of water using a motor-driven pump sprayer with a handheld spray pistol. One sample was collected at a 28-day PTI from each treated and control plot. This use pattern represents the maximum proposed treatment rate and minimum PTI. Two nectarine field trials were also conducted in Malloco (1) and Sn. Diego (1), Chile. For each trial, one control and one treated plot were established. For each trial, one application of the 1.67 lb/gal EC (1.65 lb/gal upon analysis) was made to nectarines at 0.27 lb ai/A in 214 GPA of water using a motor-driven pump sprayer with a handheld spray pistol. One sample of mature nectarines was collected at a 28-day PTI from each treated and control plot. For peach samples, six samples treated at 0.27 lb ai/A and harvested at a 28-day PTI bore nonquantifiable (<0.05 ppm) residues of pyridaben. For nectarine samples, two samples treated at 0.27 lb ai/A and harvested at a 28-day PTI bore nonquantifiable (<0.05 ppm) residues of pyridaben. HED concludes the submitted residue data support a time-limited tolerance level of 0.05 ppm for residues of pyridaben in/on peaches.

HED concludes the geographical distribution of the residue field trials is not adequate for the proposed tolerances on peaches. An additional peach field trial conducted in Chile is required. This additional field trial must be conducted at the maximum proposed use rate and the minimum PHI. HED recommends that two independently composited treated samples be collected. We will withhold a final conclusion on the appropriate levels for

permanent tolerances for pyridaben in/on peaches pending submission of these data.

Plums: Six field trials were conducted in Sn. Diego (1), Puangue (2), and Malloco (3), Chile depicting residues of pyridaben in/on five varieties of plums (MRID 432589-10). Sites with more than one trial were side-by-side plots containing different varieties of plums. For each trial site, one control plot was established. For each test plot, one application of the 1.67 lb/gal EC (1.65 lb/gal upon analysis) was made to plums at 0.27 lb ai/A in 214 GPA of water using a motor-driven pump sprayer with a handheld spray pistol. One sample was collected at a 28-day PTI from each treated and control plot. For six samples treated at 0.27 lb ai/A and harvested at a 28-day PTI bore nonquantifiable (<0.05 ppm) residues of pyridaben. HED concludes the submitted residue data support a time-limited tolerance level of 0.05 ppm for residues of pyridaben in/on plums.

HED concludes the geographical distribution of the residue field trials is not adequate for the proposed tolerances on plums. An additional plum field trial conducted in Chile is required. This additional field trial must be conducted at the maximum proposed use rate and the minimum PHI. HED recommends that two independently composited treated samples be collected. We will withhold a final conclusion on the appropriate levels for permanent tolerances for pyridaben in/on plums pending submission of these data.

Processing data for plums were not submitted. As a significant amount of dried prunes are imported from Chile, a plum processing study will be required to support this petition. HED will translate data from the grape processing study (grapes processed to raisins) to plums and prunes <u>for the purposes of a time-limited tolerance</u>. HED tentatively concludes concentration of residues of pyridaben is not expected when plums are processed to prunes. A final conclusion will be withheld until the results of the plum processing study are submitted.

Grapes: Eight field trials were conducted in Peneflor (1), Sn. Diego (2), Malloco (2), and Melipilla (3), Chile depicting residues of pyridaben in/on grapes (MRID 432589-10). Trial sites with more than one trial were side-by-side plots comparing different varieties of grapes. One control plot was established at each site. For each test plot, one application of the 1.67 lb/gal EC (1.65 lb/gal upon analysis) was made to grapes at 0.27 lb ai/A in 214 GPA of water using a motor-driven pump sprayer with a handheld spray pistol. One sample was collected at a 28-day PTI from each treated and control plot. Residues of pyridaben were <0.05-0.56 ppm in/on eight samples treated at 0.27 lb ai/A and harvested at a 28-day PTI. HED concludes the submitted residue data support a time-limited tolerance level of

0.75 ppm for residues of pyridaben in/on grapes.

Two field trials were conducted in Via Dosseli, Rovato, Brescia (1) and Soriasco di S.M. della Versa, Pavia (1) located in Lombardia, Italy depicting residues of pyridaben in/on grapes. For each treated plot, one application of the 1.67 lb/gal EC was made to grapes at 0.26 lb ai/A (1x) in 108 or 109 GPA of water using a motor driven pump sprayer with a handheld spray pistol. One treated sample was collected from each treated plot at 0-, 13-/14-day PTIs. For the 0-day PTI, pyridaben residues were 0.68 and 0.28 ppm in/on two grape samples treated at 0.26 lb ai/A (1x) of the 1.67 lb/gal EC. For the 13- and 14-day PTIs, pyridaben residues were 0.26 and 0.12 ppm, respectively in/on two grape samples treated at 0.26 lb ai/A (1x) with the 1.67 lb/gal EC. As the submitted petition is for fruit grown in Chile and Brazil, the residue data from Italy is considered supporting information and does not satisfy the requirements for the number of field trials to be conducted in the importing countries.

HED concludes the geographical distribution of the residue field trials is not adequate for the proposed tolerances on grapes. A total of 2 additional grape field trials conducted in Chile is required. These additional field trials must be conducted at the maximum proposed use rate and the minimum PHI. HED recommends that two independently composited treated samples be collected from each field trial. We will withhold a final conclusion on the appropriate levels for permanent tolerances for pyridaben in/on grapes pending submission of these data.

Two trials were conducted in Burgundy, France depicting residues of pyridaben in/on grape processed fractions (MRID 432589-16). For one test, two applications of the 1.67 lb/gal EC were made to grapes at either 0.12 or 0.13 lb ai/A for a total of 0.25 lb ai/A (1x). For the other test, two applications of the EC were made at 1.23 and 1.22 lb ai/A for a total of 2.45 lb ai/A (9x). One ≥50 kg randomly collected sample was collected from both the control and each of the treated plots at a 14-day PTI to be sent to the processor. Samples were processed by Viticulture Recherche et Developpement, Grabels, France according to local commercial practices. In the 9x samples, residues of pyridaben were 0.67 ppm in grapes, 0.63 ppm in raisins and <0.05 ppm in juice.

Vii. Anticipated Residues

DRES Analysis based upon Tolerance Level Residues: In a meeting of the HED Metabolism Committee, it was determined the tolerance expression for plant commodities will include residues of pyridaben *per se*. It was further concluded that all organosoluble residues may be presumed to be of comparable toxicity to the parent. Thus, the risk assessment for human

dietary consumption of pyridaben treated plant commodities will include all organosoluble residues. HED has calculated a value of 2.3 for the ratio of organosoluble residues to pyridaben (O/P Ratio) based upon the low dose pyridaben apple and orange metabolism studies. For DRES analysis, tolerance levels of pyridaben in/on plant commodities were multiplied by the ratio of organosoluble residues to pyridaben (2.3) (see Table 2). For livestock commodities, the HED Metabolism Committee determined that the tolerance expression for ruminant commodities will include pyridaben and its metabolites PB-7 and PB-9. As all organosoluble residues are presumed to be of comparable toxicity to the parent, the risk assessment for human dietary consumption of commodities from livestock exposed to pyridaben included all organosoluble residues. As tolerance levels for meat and milk are based upon a ruminant feeding study in which the dose levels were exaggerated by a factor of approximately seven and are therefore considered to be over-estimated, HED did not further adjust the levels to be utilized in the DRES analysis. Table 2 summarizes the residue levels utilized in the DRES analysis for pyridaben.

Table 2. Residue Levels of Pyridaben Utilized in the DRES Analysis for Pyridaben. (Based Upon Tolerance Level Residues)

Commodity	Residue Level (ppm)
Citrus	1.2
Citrus Juices	1.2
Apples	1.5
Apple Juice	1.5
Pears	1.7
Almonds	0.12
Peaches (Nectarines also)	0.12
Plums	0.12
Prunes	0.12
Grapes	1.7
Grape Juice	1.7
Raisins	1.7
Fat*	0.05
Meat*	0.05
Meat Byproducts*	0.05
Whole Milk	0.01

* of cattle, goats, hogs, horses and sheep.

Anticipated Residue Estimates - Plant Commodities: Pyridaben is to be regulated based upon non-carcinogenic chronic effects. For plant commodities, anticipated residue estimates (ARs) were based upon the average residue levels from field trials conducted at the maximum proposed use rate and minimum PHI and the ratio of organosoluble residues to pyridaben residues (2.3). ARs for processed commodities were based upon the average residue level for that commodity from field trials conducted at the maximum proposed use rate and minimum PHI, the ratio of organosoluble residues to pyridaben residues and the concentration factor for the processed commodity. In some cases, adjustment for degradation of residues prior to analysis was necessary. ARs for livestock feedstuffs were utilized to determine the dietary burden for ruminants and ARs for ruminant commodities. For residue levels below the method limit of quantification, HED assumed residue levels to be equivalent to one half the limit of quantification. Monitoring data for pyridaben are not currently available. Table 3 summarizes the residue levels utilized in the dietary risk assessment for pyridaben.

Table 3. Residue Levels of Pyridaben Utilized in the DRES Analysis for Pyridaben. **(Based Upon Anticipated Residues)**

Commodity	Anticipated Residue Level (ppm)
Oranges (Pulp and Peel)	0.37
Orange juice	0.036
Tangerines	0.37
Tangerine juice	0.036
Tangelos	0.37
Grapefruit (Pulp and Peel)	0.30
Grapefruit juice	0.029
Lemons (Pulp and Peel)	0.78
Lemon Juice	0.075
Limes (Pulp and Peel)	0.78
Lime Juice	0.075
Kumquats	0.78
Citron	0.78
Apples	0.63
Apple juice	0.057
Pears	0.87
Almonds (nutmeat)	0.058

Peaches	0.058
Nectarines	0.058
Plums	0.058
Prunes	0.054
Grapes	0.47
Grape juice	0.027
Raisins	0.45
Meat, lean*	0.0010
Fat*	0.0030
Organ Meats - Kidney*	0.0033
Organ Meats - Liver*	0.011
Organ Meats - Other*	0.011
Meat byproducts*	0.011
Whole Milk	0.00044

* of cattle, goats, hogs, horses and sheep.

B. Dietary Exposure From Drinking Water

HED does not have drinking water monitoring data available to perform a quantitative drinking water risk assessment for pyridaben at this time. Based on the available environmental fate data, conservative screening tools, GENEEC and Leaching Index, have been used to estimate environmental concentrations of pyridaben in surface water and the leaching potential of pyridaben.

Groundwater: Pyridaben is immobile and thus unlikely to leach to groundwater.

Surface Water: Pyridaben concentrations in surface water from agricultural runoff have been estimated by using the Generic Expected Environmental Concentration (GENEEC) model. GENEEC is a Tier 1 screening level model for determining concentrations of pesticides in surface water. GENEEC uses the soil/water partition coefficient, hydrolysis half life, and maximum label rate to estimate surface water concentration. GENEEC was designed for ecological risk assessment. In addition, the model contains a number of conservative underlying assumptions. Therefore, the drinking water concentrations derived from GENEEC for surface water are likely overestimates.

Table 4- Estimates of Exposure to Pyridaben from Drinking Water

Population Subgroup[1]	Acute/Chronic Tap Water Intake (g/kg/day)	Acute/Chronic[2] Exposure (mg/kg/day)[3]
whole U.S. population	50.0/19.4	1.1×10^{-4} / 9.7×10^{-7}
non-nursing infants (<1 yr)	126.5/35.3	2.9×10^{-4} / 1.8×10^{-6}

[1] The most highly exposed population subgroups.
[2] Exposure from drinking water (mg/kg/day) = (ppb pyridaben in water consumed) (10^{-6}) (tap water intake) where 10^{-6} represents two (10^{-3}) conversion factors for ppb.
[3] GENEEC calculates the peak (acute) concentration in runoff water adjacent to the application area to be 23 ppb and the chronic concentration to be 0.05 ppb.

These values represent water consumption at the 95th (acute) or 50th (chronic) percentile of each population or subpopulation. The water consumption data are from the US Department of Agriculture's 1977-1978 NFCS (Erschow and Cantor 1989). Water consumption data are weighted to correct sampling bias in a manner similar to that used for food consumption. Also, values are corrected for self-reported body weight to decrease variance in the data (Jones 1997, personal communication). Water consumption values represent drinking water from tapwater only. Tapwater is defined as "...all water from the household tap consumed directly as beverage or used to prepare food and beverages. [It] does not include water based beverages or carbonated or bottled water (Erschow and Cantor 1989)."

The GENEEC model estimates body-weight based chronic exposure values for pyridaben to be 9.7×10^{-7} mg/kg/day for the whole U.S. population and 1.8×10^{-6} mg/kg/day for non-nursing infants (<1 year old) (Table 4). These values represent <0.1% of the RfD. As GENEEC is a conservative screening tool and the exposure estimates for both adults and children are well below 1% of the RfD, HED concludes that the potential for chronic dietary exposure through drinking water is insignificant.

C. Dietary Risk Characterization- Food Sources

i. Acute Dietary Risk. The acute dietary exposure effects of concern for pyridaben are based on clinical signs in the acute neurotoxicity study. For the population subgroup with the

highest exposure, non-nursing infants (<1 year), the maximum estimated single day exposure is 0.04 mg/kg/day which provides a MOE of 1250 (Attachment I).

ii. Chronic Dietary Risk. Chronic dietary exposure estimates (DRES) for pyridaben are summarized in Attachment II (run dated 1/29/97). The proposed pyridaben tolerances result in a Theoretical Maximum Residue Contribution (TMRC) that is equivalent to the following percents of the RfD:

	TMRC	ARC
U.S Population	98%	12%
Nursing Infants	292%	59%
Non-Nursing Infants (<1 yr old)	448%	74%
Children (1-6 years old)	290%	30%
Children (7-12 years old)	143%	18%

The subgroups listed above are: (1) the U.S. population (48 states) and (2) those for different age groups of infants and children. Also shown above are dietary risk estimates based on anticipated residue estimates (ARC).

VIII. DETERMINATION OF SAFETY FOR INFANTS AND CHILDREN

The toxicological database for evaluating pre- and post-natal toxicity of pyridaben is considered to be complete at this time. Based on the available toxicity data, HED does not have concerns regarding special sensitivities for infants and children exposed to pyridaben. The use of an additional uncertainty factor will not be required.

The HED RfD Committee determined that there was no evidence, based upon available data, that pyridaben was associated with significant developmental or reproductive toxicity under the testing conditions (memo dated 5-11-94).

In rat, no evidence of increased fetal sensitivity: decreased fetal wt. gain and incomplete ossification were observed at a higher dose than maternal toxicity (developmental NOEL = 30 mg/kg/day vs. maternal LOEL = 13 mg/kg/day). The fetal effects occurred at a higher dose than the maternal LOEL and are considered to be secondary to maternal toxicity.

In rabbit, no evidence of increased fetal sensitivity: developmental effects were observed at the highest dose tested (15 mg/kg/day) and the maternal LOEL = 5 mg/kg/day, based on body weight and food consumption (changed from original review by RfD Committee), as well as increased incidence of abortion at 15 mg/kg/day. In a dermal rabbit developmental toxicity study, maternal body weight loss and decreased food consumption were

observed at 170 mg/kg/day and developmental effects (increased incidence of unossified skull bones) was observed at 450 mg/kg/day. The abortions (gavage study) and fetal skeletal effects (dermal study) occurred at a higher dose than the maternal LOEL and are considered to be secondary to maternal toxicity.

In the 2-generation rat reproduction study, no evidence of increased offspring sensitivity: no reproductive parameters were affected $\geq$ 6.31 mg/kg/day (highest dose tested) and the parental LOEL = 6.31 mg/kg/day, based on decreased body weight and food efficiency. Decreased pup weight beginning on lactation day 14 was considered to be secondary to maternal effects and indicated that compound was reaching the pups through nursing. Since this effect was observed in the presence of maternal toxicity and no reproductive effects were observed, no special sensitivity for offspring are identified.

IX. OCCUPATIONAL AND RESIDENTIAL EXPOSURE AND RISK CHARACTERIZATION

Short-Term or Intermediate-Term: As part of the hazard assessment process, the Agency reviews the available toxicological database to determine the endpoints of concern. For pyridaben, the Agency does not have a concern for a short-term or intermediate-term occupational or residential risk assessment since the available data does not indicate any evidence of significant toxicity by the dermal or inhalation routes. Therefore, a short-term or intermediate-term occupational or residential risk assessment was not required.

Chronic: As part of the hazard assessment process an endpoint of concern was determined for the chronic occupational or residential assessment. However, during the exposure assessment process, the exposures which would result from the use of pyridaben were determined to be of an intermittent nature. The frequency and duration of these exposures do not exhibit a chronic exposure pattern. The exposures do not occur often enough to be considered a chronic exposure i.e., a continuous exposure that occurs for at least several months. Therefore, a chronic occupational or residential assessment was not required. There is no chronic occupational or residential assessment to aggregate with the chronic dietary (food source and drinking water) assessment.

X. OTHER CONSIDERATIONS

A. Cumulative Effects

Pyridaben is structurally similar to other members of the pyridazinone class of pesticides (i.e., pyrazon and norflurazon). Further, other pesticides may have common toxicity endpoints with pyridaben.

However the Agency has not made a determination whether pyridaben and any other pesticide have a common mode of toxicity and require cumulative risk assessment. For the purposes of these tolerances and registration applications, the Agency has considered only risks from pyridaben. If required, cumulative risks will be assessed as part of tolerance reassessment, and when methodologies for determining common mode of toxicity and for performing cumulative risk assessment are finalized.

B. Total Aggregate Exposure

i. Acute Risk. For the population subgroup with the highest exposure, non-nursing infants (<1 year), the maximum estimated single day exposure is 0.04 mg/kg/day from food sources and 0.00029 mg/kg/day from drinking water. The drinking water is two orders of magnitude lower than the food sources of exposure. The acute dietary exposer is essentially the exposure from food. Thus, the aggregate acute dietary MOE is also 1250.

ii. Chronic Risk. Based on the available data and assumptions used for dietary/water/residential exposure and risk estimates, the population group estimated to be the most highly exposed to pyridaben is non-nursing infants (<1 yr old), with a risk estimate from combined sources equalling 74% of the RfD (dietary = 74% of the RfD + drinking water = <1% of the RfD).

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Attachments

I. Acute DRES run

II. Chronic DRES run

cc: RCAB Files, G. Kramer, W. Wassell (HED/CBTS)
RDI: Team (4/22/97), M.S. Metzger (4/23/97)
G.F. Kramer:804V:CM#2:(703)305-5079:7509C:CBTS

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

MAR 29 1997

MAR 29

MEMORANDUM

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

SUBJECT: Acute Dietary Exposure Analysis for Pyridaben in/on Apples (PP# 6F4694).

FROM: Brian Steinwand BJ
Dietary Risk Evaluation Section
Science Analysis Branch/HED (7509C)

Through: Elizabeth Doyle, Section Head
Dietary Risk Evaluation Section
SAB/Health Effects Division

TO: M. Metzger, Chief
RCAB (7509C)

Action Requested

Provide an acute dietary exposure analysis for the use of pyridaben in/on apples.

Discussion

Toxicological Endpoint:

The endpoint for acute dietary risk assessment is the NOEL (50 mg/kg/day) from an acute oral neurotoxicity study in rats. The effects at the LOEL of 100 mg/kg/day were clinical signs of toxicity, and a decrease in food consumption and body weight gain.

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ANTICIPATED RESIDUE INFORMATION FOR CASWELL NUMBER 129105 DATE: 01/29/97 PAGE: 1

CHEMICAL	STUDY TYPES	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
PYRIDABEN Caswell #129105 CAS No. A.I. CODE: 129105 CFR No.	NOEL= 0.[illegible] g/kg 0.[illegible] ppm LEL= 0.50[illegible] mg/kg 0.00 ppm ONCO:		OPP RfD= 0.005000 EPA RfD= 0.000000		

FOOD CODE	FOOD	FOOD FORM	PET.#	TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
01014AA	GRAPES-FRESH	10 RAW-FRESH OR NFS	4E4370	P 1.700000	0.470000		100.00	0.470000
01014AA	GRAPES-FRESH	21 COOKED-NFS	4E4370	P 1.700000	0.470000		100.00	0.470000
01014AA	GRAPES-FRESH	31 COOKED-FRESH OR CANNED	4E4370	P 1.700000	0.470000		100.00	0.470000
01014DA	GRAPES-RAISINS	10 RAW-FRESH OR NFS	4E4370	P 1.700000	0.450000C		100.00	0.450000
01014DA	GRAPES-RAISINS	21 COOKED-NFS	4E4370	P 1.700000	0.450000C		100.00	0.450000
01014DA	GRAPES-RAISINS	22 COOKED-FRESH-BAKED	4E4370	P 1.700000	0.450000C		100.00	0.450000
01014JA	GRAPES-JUICE	10 RAW-FRESH OR NFS	4E4370	P 1.700000	0.027000C		100.00	0.027000
01014JA	GRAPES-JUICE	15 RAW-FRESH OR CANNED	4E4370	P 1.700000	0.027000C		100.00	0.027000
01014JA	GRAPES-JUICE	21 COOKED-NFS	4E4370	P 1.700000	0.027000C		100.00	0.027000
02002AA	GRAPEFRUIT-UNSP	00 NOT SPECIFIED	5F4543	P 1.200000	0.300000		100.00	0.300000
02002AB	GRAPEFRUIT-PULP	10 RAW-FRESH OR NFS	5F4543	P 1.200000	0.300000		100.00	0.300000
02002AB	GRAPEFRUIT-PULP	21 COOKED-NFS	5F4543	P 1.200000	0.300000		100.00	0.300000
02002JA	GRAPEFRUIT-JUICE	15 RAW-FRESH OR CANNED	5F4543	P 1.200000	0.029000C		100.00	0.029000
02002JA	GRAPEFRUIT-JUICE	31 COOKED-FRESH OR CANNED	5F4543	P 1.200000	0.029000C		100.00	0.029000
02004AA	LEMONS-UNSPEC	10 RAW-FRESH OR NFS	5F4543	P 1.200000	0.780000		100.00	0.780000
02004AA	LEMONS-UNSPEC	22 COOKED-FRESH-BAKED	5F4543	P 1.200000	0.780000		100.00	0.780000
02004AB	LEMONS-PULP	10 RAW-FRESH OR NFS	5F4543	P 1.200000	0.780000		100.00	0.780000
02004AB	LEMONS-PULP	31 COOKED-FRESH OR CANNED	5F4543	P 1.200000	0.780000		100.00	0.780000
02004HA	LEMONS-PEEL	10 RAW-FRESH OR NFS	5F4543	P 1.200000	0.780000		100.00	0.780000
02004HA	LEMONS-PEEL	21 COOKED-NFS	5F4543	P 1.200000	0.780000		100.00	0.780000
02004JA	LEMONS-JUICE	10 RAW-FRESH OR NFS	5F4543	P 1.200000	0.075000C		100.00	0.075000
02004JA	LEMONS-JUICE	15 RAW-FRESH OR CANNED	5F4543	P 1.200000	0.075000C		100.00	0.075000
02004JA	LEMONS-JUICE	21 COOKED-NFS	5F4543	P 1.200000	0.075000C		100.00	0.075000
02004JA	LEMONS-JUICE	31 COOKED-FRESH OR CANNED	5F4543	P 1.200000	0.075000C		100.00	0.075000
02005AA	LIMES-UNSPEC	00 NOT SPECIFIED	5F4543	P 1.200000	0.780000		100.00	0.780000
02005AB	LIMES-PULP	10 RAW-FRESH OR NFS	5F4543	P 1.200000	0.780000		100.00	0.780000
02005HA	LIMES-PEEL	21 COOKED-NFS	5F4543	P 1.200000	0.780000		100.00	0.780000
02005JA	LIMES-JUICE	10 RAW-FRESH OR NFS	5F4543	P 1.200000	0.075000C		100.00	0.075000
02005JA	LIMES-JUICE	15 RAW-FRESH OR CANNED	5F4543	P 1.200000	0.075000C		100.00	0.075000
02005JA	LIMES-JUICE	31 COOKED-FRESH OR CANNED	5F4543	P 1.200000	0.075000C		100.00	0.075000
02006AA	ORANGES-UNSPEC	00 NOT SPECIFIED	5F4543	P 1.200000	0.370000		100.00	0.370000
02006AB	ORANGES-PULP	10 RAW-FRESH OR NFS	5F4543	P 1.200000	0.370000		100.00	0.370000
02006AB	ORANGES-PULP	21 COOKED-NFS	5F4543	P 1.200000	0.370000		100.00	0.370000
02006HA	ORANGES-PEEL	21 COOKED-NFS	5F4543	P 1.200000	0.370000		100.00	0.370000
02006HA	ORANGES-PEEL	22 COOKED-FRESH-BAKED	5F4543	P 1.200000	0.370000		100.00	0.370000
02006HA	ORANGES-PEEL	31 COOKED-FRESH OR CANNED	5F4543	P 1.200000	0.370000		100.00	0.370000
02006JA	ORANGES-JUICE	15 RAW-FRESH OR CANNED	5F4543	P 1.200000	0.036000C		100.00	0.036000
02006JA	ORANGES-JUICE	31 COOKED-FRESH OR CANNED	5F4543	P 1.200000	0.036000C		100.00	0.036000
02007AA	TANGELOS	10 RAW-FRESH OR NFS	5F4543	P 1.200000	0.370000		100.00	
02008AA	TANGERINES	10 RAW-FRESH OR NFS	5F4543	P 1.200000	0.370000		100.00	

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
PYRIDABEN Caswell #129105 CAS No. A.I. CODE: 129105 CFR No.	FEEDING STUDY IN DOG NOEL= 0.0000 mg/kg 0.00 ppm LEL= 0.5000 mg/kg 0.00 ppm ONCO:		UF >0 OPP RfD= 0.005000 EPA RfD= 0.000000		

FOOD CODE	FOOD	FOOD FORM	PET.#	TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
02008JA	TANGERINE-JUICE	15 RAW-FRESH OR CANNED	5F4543	P 1.200000	0.036000C		100.00	0.036000
03001AA	ALMONDS	10 RAW-FRESH OR NFS	6F4721	P 0.120000	0.058000		100.00	0.058000
03001AA	ALMONDS	21 COOKED-NFS	6F4721	P 0.120000	0.058000		100.00	0.058000
03001AA	ALMONDS	22 COOKED-FRESH-BAKED	6F4721	P 0.120000	0.058000		100.00	0.058000
04001AA	APPLES-FRESH	10 RAW-FRESH OR NFS	6F4651	P 1.500000	0.630000		100.00	0.630000
04001AA	APPLES-FRESH	21 COOKED-NFS	6F4651	P 1.500000	0.630000		100.00	0.630000
04001AA	APPLES-FRESH	31 COOKED-FRESH OR CANNED	6F4651	P 1.500000	0.630000		100.00	0.630000
04001AA	APPLES-FRESH	62 COOKED-FRESH OR FROZEN-BAKED	6F4651	P 1.500000	0.630000		100.00	0.630000
04001DA	APPLES-DRIED	10 RAW-FRESH OR NFS	6F4651	P 1.500000	0.630000C		100.00	0.630000
04001DA	APPLES-DRIED	22 COOKED-FRESH-BAKED	6F4651	P 1.500000	0.630000C		100.00	0.630000
04001DA	APPLES-DRIED	62 COOKED-FRESH OR FROZEN-BAKED	6F4651	P 1.500000	0.630000C		100.00	0.630000
04001JA	APPLES-JUICE	15 RAW-FRESH OR CANNED	6F4651	P 1.500000	0.057000C		100.00	0.057000
04001JA	APPLES-JUICE	31 COOKED-FRESH OR CANNED	6F4651	P 1.500000	0.057000C		100.00	0.057000
04003AA	PEARS-FRESH	10 RAW-FRESH OR NFS	6F4741	P 1.700000	0.870000		100.00	0.870000
04003AA	PEARS-FRESH	31 COOKED-FRESH OR CANNED	6F4741	P 1.700000	0.870000		100.00	0.870000
04003AA	PEARS-FRESH	51 COOKED-CANNED	6F4741	P 1.700000	0.870000		100.00	0.870000
04003AA	PEARS-FRESH	62 COOKED-FRESH OR FROZEN-BAKED	6F4741	P 1.700000	0.870000		100.00	0.870000
04003DA	PEARS-DRIED	10 RAW-FRESH OR NFS	6F4741	P 1.700000	0.870000		100.00	0.870000
04003DA	PEARS-DRIED	21 COOKED-NFS	6F4741	P 1.700000	0.870000		100.00	0.870000
05003AA	NECTARINES	10 RAW-FRESH OR NFS	4E4370	P 0.120000	0.058000		100.00	0.058000
05004AA	PEACHES-FRESH	10 RAW-FRESH OR NFS	4E4370	P 0.120000	0.058000		100.00	0.058000
05004AA	PEACHES-FRESH	21 COOKED-NFS	4E4370	P 0.120000	0.058000		100.00	0.058000
05004AA	PEACHES-FRESH	31 COOKED-FRESH OR CANNED	4E4370	P 0.120000	0.058000		100.00	0.058000
05004AA	PEACHES-FRESH	51 COOKED-CANNED	4E4370	P 0.120000	0.058000		100.00	0.058000
05004DA	PEACHES-DRIED	10 RAW-FRESH OR NFS	4E4370	P 0.120000	0.058000		100.00	0.058000
05004DA	PEACHES-DRIED	21 COOKED-NFS	4E4370	P 0.120000	0.058000		100.00	0.058000
05005AA	PLUMS-FRESH	10 RAW-FRESH OR NFS	4E4370	P 0.120000	0.058000		100.00	0.058000
05005AA	PLUMS-FRESH	31 COOKED-FRESH OR CANNED	4E4370	P 0.120000	0.058000		100.00	0.058000
05005DA	PLUMS-PRUNES	10 RAW-FRESH OR NFS	4E4370	P 0.120000	0.054000		100.00	0.054000
05005DA	PLUMS-PRUNES	21 COOKED-NFS	4E4370	P 0.120000	0.054000		100.00	0.054000
05005DA	PLUMS-PRUNES	31 COOKED-FRESH OR CANNED	4E4370	P 0.120000	0.054000		100.00	0.054
05005JA	PRUNE-JUICE	10 RAW-FRESH OR NFS	4E4370	P 0.120000	0.054000C		100.00	0.0540
05005JA	PRUNE-JUICE	62 COOKED-FRESH OR FROZEN-BAKED	4E4370	P 0.120000	0.054000C		100.00	0.0540
50000DB	MILK-NON-FAT SOL	10 RAW-FRESH OR NFS	5F4543	P 0.010000	0.000440		100.00	0.00044
50000DB	MILK-NON-FAT SOL	21 COOKED-NFS	5F4543	P 0.010000	0.000440		100.00	0.00044
50000DB	MILK-NON-FAT SOL	51 COOKED-CANNED	5F4543	P 0.010000	0.000440		100.00	0.00044
50000FA	MILK-FAT SOLIDS	10 RAW-FRESH OR NFS	5F4543	P 0.010000	0.000440C		100.00	0.00044
50000FA	MILK-FAT SOLIDS	21 COOKED-NFS	5F4543	P 0.010000	0.000440C		100.00	0.00044
50000FA	MILK-FAT SOLIDS	51 COOKED-CANNED	5F4543	P 0.010000	0.000440C		100.00	0.00044
50000SA	MILK SUG (LACT)	21 COOKED-NFS	5F4543	P 0.010000	0.000440		100.00	0.0004

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CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
PYRIDABEN Caswell #129105 CAS No. A.I. CODE: 129105 CFR No.	FEEDING STUDY IN DOG NOEL= 0.0000 mg/kg 0.00 ppm LEL= 0.5000 mg/kg 0.00 ppm ONCO:		UF -->0 OPP RfD= 0.005000 EPA RfD= 0.000000		

FOOD CODE	FOOD	FOOD FORM	PET.#	TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
50000SA	MILK SUG (LACT)	51 COOKED-CANNED	5F4543	P 0.010000	0.000440		100.00	0.000440
53001BA	BEEF-MEAT BYP	21 COOKED-NFS	5F4543	P 0.050000	0.001000		100.00	0.001000
53001BA	BEEF-MEAT BYP	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	5F4543	P 0.050000	0.001000		100.00	0.001000
53001BB	BEEF-OTH ORGAN	21 COOKED-NFS	5F4543	P 0.050000	0.011000		100.00	0.011000
53001BB	BEEF-OTH ORGAN	51 COOKED-CANNED	5F4543	P 0.050000	0.011000		100.00	0.011000
53001DA	BEEF-DRIED	21 COOKED-NFS	5F4543	P 0.050000	0.001000		100.00	0.001000
53001FA	BEEF-FAT	10 RAW-FRESH OR NFS	5F4543	P 0.050000	0.003000		100.00	0.003000
53001FA	BEEF-FAT	21 COOKED-NFS	5F4543	P 0.050000	0.003000		100.00	0.003000
53001FA	BEEF-FAT	22 COOKED-FRESH-BAKED	5F4543	P 0.050000	0.003000		100.00	0.003000
53001FA	BEEF-FAT	23 COOKED-FRESH-BOILED	5F4543	P 0.050000	0.003000		100.00	0.003000
53001FA	BEEF-FAT	24 COOKED-FRESH-BROILED	5F4543	P 0.050000	0.003000		100.00	0.003000
53001FA	BEEF-FAT	25 COOKED-FRESH-FRIED	5F4543	P 0.050000	0.003000		100.00	0.003000
53001KA	BEEF-KIDNEY	21 COOKED-NFS	5F4543	P 0.050000	0.003300		100.00	0.003300
53001LA	BEEF-LIVER	25 COOKED-FRESH-FRIED	5F4543	P 0.050000	0.011000		100.00	0.011000
53001LA	BEEF-LIVER	31 COOKED-FRESH OR CANNED	5F4543	P 0.050000	0.011000		100.00	0.011000
53001MA	BEEF-LEAN	10 RAW-FRESH OR NFS	5F4543	P 0.050000	0.001000		100.00	0.001000
53001MA	BEEF-LEAN	21 COOKED-NFS	5F4543	P 0.050000	0.001000		100.00	0.001000
53001MA	BEEF-LEAN	22 COOKED-FRESH-BAKED	5F4543	P 0.050000	0.001000		100.00	0.001000
53001MA	BEEF-LEAN	23 COOKED-FRESH-BOILED	5F4543	P 0.050000	0.001000		100.00	0.001000
53001MA	BEEF-LEAN	24 COOKED-FRESH-BROILED	5F4543	P 0.050000	0.001000		100.00	0.001000
53002BA	GOAT-MEAT BYP	00 NOT SPECIFIED	5F4543	P 0.050000	0.011000		100.00	0.011000
53002BB	GOAT-OTH ORGAN	00 NOT SPECIFIED	5F4543	P 0.050000	0.011000		100.00	0.011000
53002FA	GOAT-FAT	23 COOKED-FRESH-BOILED	5F4543	P 0.050000	0.003000		100.00	0.003000
53002FA	GOAT-FAT	25 COOKED-FRESH-FRIED	5F4543	P 0.050000	0.003000		100.00	0.003000
53002KA	GOAT-KIDNEY	00 NOT SPECIFIED	5F4543	P 0.050000	0.003300		100.00	0.003300
53002LA	GOAT-LIVER	00 NOT SPECIFIED	5F4543	P 0.050000	0.011000		100.00	0.011000
53002MA	GOAT-LEAN	23 COOKED-FRESH-BOILED	5F4543	P 0.050000	0.001000		100.00	0.001000
53002MA	GOAT-LEAN	25 COOKED-FRESH-FRIED	5F4543	P 0.050000	0.001000		100.00	0.001000
53005BA	SHEEP-MEAT BYP	21 COOKED-NFS	5F4543	P 0.050000	0.011000		100.00	0.011000
53005BB	SHEEP-OTH ORGAN	21 COOKED-NFS	5F4543	P 0.050000	0.011000		100.00	0.011000
53005FA	SHEEP-FAT	21 COOKED-NFS	5F4543	P 0.050000	0.003000		100.00	0.003000
53005KA	SHEEP-KIDNEY	21 COOKED-NFS	5F4543	P 0.050000	0.033000		100.00	0.033000
53005LA	SHEEP-LIVER	00 NOT SPECIFIED	5F4543	P 0.050000	0.011000		100.00	0.011000
53005MA	SHEEP-LEAN	21 COOKED-NFS	5F4543	P 0.050000	0.001000		100.00	0.001000
53005MA	SHEEP-LEAN	31 COOKED-FRESH OR CANNED	5F4543	P 0.050000	0.001000		100.00	0.001000
53006BA	PORK-MEAT BYP	21 COOKED-NFS	5F4543	P 0.050000	0.011000		100.00	0.011000
53006BB	PORK-OTH ORGAN	21 COOKED-NFS	5F4543	P 0.050000	0.011000		100.00	0.0
53006BB	PORK-OTH ORGAN	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	5F4543	P 0.050000	0.011000		100.00	0.0
53006FA	PORK-FAT	10 RAW-FRESH OR NFS	5F4543	P 0.050000	0.003000		100.00	0.0
53006FA	PORK-FAT	21 COOKED-NFS	5F4543	P 0.050000	0.003000		100.00	

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
PYRIDABEN Caswell #129105 CAS No. A.I. CODE: 129105 CFR No.	FEEDING STUDY IN DOG NOEL= 0.0000 mg/kg 0.00 ppm LEL= 0.5000 mg/kg 0.00 ppm ONCO:		UF -->0 OPP RfD= 0.005000 EPA RfD= 0.000000		

FOOD CODE	FOOD	FOOD FORM	PET.#	TOLERANCE (ppm)	ANTICIPATED RESIDUE (ppm)	AR STATISTIC TYPE	% CROP TREATED	RES. VALUE USED IN TAS RUN (ppm)
53006FA	PORK-FAT	23 COOKED-FRESH-BOILED	5F4543	P 0.050000	0.003000		100.00	0.003000
53006FA	PORK-FAT	25 COOKED-FRESH-FRIED	5F4543	P 0.050000	0.003000		100.00	0.003000
53006FA	PORK-FAT	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	5F4543	P 0.050000	0.003000		100.00	0.003000
53006KA	PORK-KIDNEY	21 COOKED-NFS	5F4543	P 0.050000	0.003000		100.00	0.003000
53006LA	PORK-LIVER	21 COOKED-NFS	5F4543	P 0.050000	0.011000		100.00	0.011000
53006LA	PORK-LIVER	25 COOKED-FRESH-FRIED	5F4543	P 0.050000	0.011000		100.00	0.011000
53006MA	PORK-LEAN	21 COOKED-NFS	5F4543	P 0.050000	0.001000		100.00	0.001000
53006MA	PORK-LEAN	25 COOKED-FRESH-FRIED	5F4543	P 0.050000	0.001000		100.00	0.001000
53006MA	PORK-LEAN	26 COOKED-FRESH-PICKLED,CORNED,OR CURED	5F4543	P 0.050000	0.001000		100.00	0.001000

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CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
PYRIDABEN Caswell #129105 CAS No. A.I. CODE: 129105 CFR No.	FEEDING STUDY IN DOG NOEL= 0.0000 mg/kg 0.00 ppm LEL= 0.5000 mg/kg 0.00 ppm ONCO:		UF -->0 OPP RfD= 0.005000 EPA RfD= 0.000000		

COMMODITY CONTRIBUTION BY RAC FOR: NON-NURSING INFANTS (< 1 YEAR OLD)

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TMRC TYPE	TMRC (UG/KG/DAY)	%RFD	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD
02002AA	GRAPEFRUIT-UNSPECIFIED	1.200	P	0.000000	0.000			
	00 NOT SPECIFIED					0.30000	0.000000	0.000
02002AB	GRAPEFRUIT-PULP	1.200	P	0.000000	0.000			
	10 RAW-FRESH OR NFS					0.30000	0.000000	0.000
	21 COOKED-NFS					0.30000	0.000000	0.000
02002JA	GRAPEFRUIT-JUICE	1.200	P	0.278712	5.574			
	15 RAW-FRESH OR CANNED					0.02900	0.003207	0.064
	31 COOKED-FRESH OR CANNED					0.02900	0.000000	0.000
02004AA	LEMONS-UNSPECIFIED	1.200	P	0.000048	0.001			
	10 RAW-FRESH OR NFS					0.78000	0.000000	0.000
	22 COOKED-FRESH-BAKED					0.78000	0.000031	0.001
02004AB	LEMONS-PULP	1.200	P	0.000000	0.000			
	10 RAW-FRESH OR NFS					0.78000	0.000000	0.000
	31 COOKED-FRESH OR CANNED					0.78000	0.000000	0.000
02004HA	LEMONS-PEEL	1.200	P	0.000021	0.000			
	10 RAW-FRESH OR NFS					0.78000	0.000000	0.000
	21 COOKED-NFS					0.78000	0.000013	0.000
02004JA	LEMONS-JUICE	1.200	P	0.008792	0.176			
	10 RAW-FRESH OR NFS					0.07500	0.000043	0.001
	15 RAW-FRESH OR CANNED					0.07500	0.000000	0.000
	21 COOKED-NFS					0.07500	0.000035	0.001
	31 COOKED-FRESH OR CANNED					0.07500	0.000196	0.004
02005AA	LIMES-UNSPECIFIED	1.200	P	0.000000	0.000			
	00 NOT SPECIFIED					0.78000	0.000000	0.000
02005AB	LIMES-PULP	1.200	P	0.000000	0.000			
	10 RAW-FRESH OR NFS					0.78000	0.000000	0.000
02005HA	LIMES-PEEL	1.200	P	0.000000	0.000			
	21 COOKED-NFS					0.78000	0.000000	0.000
02005JA	LIMES-JUICE	1.200	P	0.000127	0.003			
	10 RAW-FRESH OR NFS					0.07500	0.000004	0.000
	15 RAW-FRESH OR CANNED					0.07500	0.000000	0.000
	31 COOKED-FRESH OR CANNED					0.07500	0.000000	0.000
02006AA	ORANGES-UNSPECIFIED	1.200	P	0.000000	0.000			
	00 NOT SPECIFIED					0.37000	0.000000	0.000
02006AB	ORANGES-PULP	1.200	P	0.046767	0.935			
	10 RAW-FRESH OR NFS					0.37000	0.013407	0.268
	21 COOKED-NFS					0.37000	0.001013	0.020
02006HA	ORANGES-PEEL	1.200	P	0.000070	0.001			
	21 COOKED-NFS					0.37000	0.000000	0.000
	22 COOKED-FRESH-BAKED					0.37000	0.000021	0.000
	31 COOKED-FRESH OR CANNED					0.37000	0.000000	0.000

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
PYRIDABEN Caswell #129105 CAS No. A.I. CODE: 129105 CFR No.	FEEDING STUDY IN DOG NOEL= 0.0000 mg/kg 0.00 ppm LEL= 0.5000 mg/kg 0.00 ppm ONCO:		UF -->0 OPP RfD= 0.005000 EPA RfD= 0.000000		

COMMODITY CONTRIBUTION BY RAC FOR: NON-NURSING INFANTS (< 1 YEAR OLD)

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD
50000DB	MILK-NON-FAT SOLIDS	0.010	P	0.510250	10.205			
	10 RAW-FRESH OR NFS					0.00044	0.012568	0.251
	21 COOKED-NFS					0.00044	0.001399	0.028
	51 COOKED-CANNED					0.00044	0.008484	0.170
50000FA	MILK-FAT SOLIDS	0.010	P	0.112186	2.244			
	10 RAW-FRESH OR NFS					0.00044	0.000567	0.011
	21 COOKED-NFS					0.00044	0.000051	0.001
	51 COOKED-CANNED					0.00044	0.000009	0.000
50000SA	MILK SUGAR (LACTOSE)	0.010	P	0.030305	0.606			
	21 COOKED-NFS					0.00044	0.000000	0.000
	51 COOKED-CANNED					0.00044	0.001333	0.027
	CROP GROUP TOTALS FOR DAIRY PRODUCTS:			0.652741	13.055		0.024411	0.488
	GRAND TOTALS FOR NON-NURSING INFANTS (< 1 YEAR OLD)			22.384550	447.691		3.682296	73.646

TOLERANCE TYPE: N=NEW; A=PENDING; P=PUBLISHED
TMRC=THEORETICAL MAXIMUM RESIDUE CONTRIBUTION
ARC = ANTICIPATED RESIDUE CONTRIBUTION
RFD = REFERENCE DOSE

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
PYRIDABEN Caswell #129105 CAS No. A.I. CODE: 129105 CFR No.	FEEDING STUDY IN DOG NOEL= 0.0000 mg/kg 0.00 ppm LEL= 0.5000 mg/kg 0.00 ppm ONCO:		UF -->0 OPP RfD= 0.005000 EPA RfD= 0.000000		

COMMODITY CONTRIBUTION BY RAC FOR: NON-NURSING INFANTS (< 1 YEAR OLD)

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD
53002LA	GOAT(ORGAN MEATS)-LIVER	0.050	P	0.000000	0.000			
	00 NOT SPECIFIED					0.01100	0.000000	0.000
53002MA	GOAT(BONELESS)-LEAN (W/O REMOVEABLE FAT)	0.050	P	0.000000	0.000			
	23 COOKED-FRESH-BOILED					0.00100	0.000000	0.000
	25 COOKED-FRESH-FRIED					0.00100	0.000000	0.000
53005BA	SHEEP-MEAT BYPRODUCTS	0.050	P	0.000000	0.000			
	21 COOKED-NFS					0.01100	0.000000	0.000
53005BB	SHEEP(ORGAN MEATS)-OTHER	0.050	P	0.000000	0.000			
	21 COOKED-NFS					0.01100	0.000000	0.000
53005FA	SHEEP(BONELESS)-FAT	0.050	P	0.000363	0.007			
	21 COOKED-NFS					0.00300	0.000022	0.000
53005KA	SHEEP(ORGAN MEATS)-KIDNEY	0.050	P	0.000000	0.000			
	21 COOKED-NFS					0.03300	0.000000	0.000
53005LA	SHEEP(ORGAN MEATS)-LIVER	0.050	P	0.000000	0.000			
	00 NOT SPECIFIED					0.01100	0.000000	0.000
53005MA	SHEEP(BONELESS)-LEAN (W/O REMOVEABLE FAT	0.050	P	0.003152	0.063			
	21 COOKED-NFS					0.00100	0.000002	0.000
	31 COOKED-FRESH OR CANNED					0.00100	0.000061	0.001
53006BA	PORK-MEAT BYPRODUCTS	0.050	P	0.000287	0.006			
	21 COOKED-NFS					0.01100	0.000063	0.001
53006BB	PORK(ORGAN MEATS)-OTHER	0.050	P	0.000077	0.002			
	21 COOKED-NFS					0.01100	0.000017	0.000
	26 COOKED-FRESH-PICKLED,CORNED,OR CURED					0.01100	0.000000	0.000
53006FA	PORK(BONELESS)-FAT (INCLUDING LARD)	0.050	P	0.007326	0.147			
	10 RAW-FRESH OR NFS					0.00300	0.000002	0.000
	21 COOKED-NFS					0.00300	0.000362	0.007
	23 COOKED-FRESH-BOILED					0.00300	0.000033	0.001
	25 COOKED-FRESH-FRIED					0.00300	0.000019	0.000
	26 COOKED-FRESH-PICKLED,CORNED,OR CURED					0.00300	0.000023	0.000
53006KA	PORK(ORGAN MEATS)-KIDNEY	0.050	P	0.000000	0.000			
	21 COOKED-NFS					0.00300	0.000000	0.000
53006LA	PORK(ORGAN MEATS)-LIVER	0.050	P	0.000753	0.015			
	21 COOKED-NFS					0.01100	0.000166	0.003
	25 COOKED-FRESH-FRIED					0.01100	0.000000	0.000
53006MA	PORK(BONELESS)-LEAN (W/O REMOVEABLE FAT)	0.050	P	0.022087	0.442			
	21 COOKED-NFS					0.00100	0.000412	0.008
	25 COOKED-FRESH-FRIED					0.00100	0.000013	0.000
	26 COOKED-FRESH-PICKLED,CORNED,OR CURED					0.00100	0.000016	0.000
	CROP GROUP TOTALS FOR RED MEAT:			0.107270	2.145		0.003403	0.068

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CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
PYRIDABEN Caswell #129105 CAS No. A.I. CODE: 129105 CFR No.	FEEDING STUDY IN DOG NOEL= 0.0000 mg/kg 0.00 ppm LEL= 0.5000 mg/kg 0.00 ppm ONCO:		UF -->0 OPP RfD= 0.005000 EPA RfD= 0.000000		

COMMODITY CONTRIBUTION BY RAC FOR: NON-NURSING INFANTS (< 1 YEAR OLD)

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD
03001AA	ALMONDS	0.120	P	0.000256	0.005			
	10 RAW-FRESH OR NFS					0.05800	0.000000	0.000
	21 COOKED-NFS					0.05800	0.000093	0.002
	22 COOKED-FRESH-BAKED					0.05800	0.000031	0.001
	CROP GROUP TOTALS FOR TREE NUTS:			0.000256	0.005		0.000124	0.002
53001BA	BEEF-MEAT BYPRODUCTS	0.050	P	0.000551	0.011			
	21 COOKED-NFS					0.00100	0.000011	0.000
	26 COOKED-FRESH-PICKLED,CORNED,OR CURED					0.00100	0.000000	0.000
53001BB	BEEF(ORGAN MEATS)-OTHER	0.050	P	0.000155	0.003			
	21 COOKED-NFS					0.01100	0.000017	0.000
	51 COOKED-CANNED					0.01100	0.000017	0.000
53001DA	BEEF-DRIED	0.050	P	0.000000	0.000			
	21 COOKED-NFS					0.00100	0.000000	0.000
53001FA	BEEF(BONELESS)-FAT (BEEF TALLOW)	0.050	P	0.009564	0.191			
	10 RAW-FRESH OR NFS					0.00300	0.000002	0.000
	21 COOKED-NFS					0.00300	0.000374	0.007
	22 COOKED-FRESH-BAKED					0.00300	0.000042	0.001
	23 COOKED-FRESH-BOILED					0.00300	0.000068	0.001
	24 COOKED-FRESH-BROILED					0.00300	0.000078	0.002
	25 COOKED-FRESH-FRIED					0.00300	0.000010	0.000
53001KA	BEEF(ORGAN MEATS)-KIDNEY	0.050	P	0.000000	0.000			
	21 COOKED-NFS					0.00330	0.000000	0.000
53001LA	BEEF(ORGAN MEATS)-LIVER	0.050	P	0.001562	0.031			
	25 COOKED-FRESH-FRIED					0.01100	0.000077	0.002
	31 COOKED-FRESH OR CANNED					0.01100	0.000267	0.005
53001MA	BEEF(BONELESS)-LEAN (W/O REMOVEABLE FAT)	0.050	P	0.061393	1.228			
	10 RAW-FRESH OR NFS					0.00100	0.000000	0.000
	21 COOKED-NFS					0.00100	0.001074	0.021
	22 COOKED-FRESH-BAKED					0.00100	0.000029	0.001
	23 COOKED-FRESH-BOILED					0.00100	0.000062	0.001
	24 COOKED-FRESH-BROILED					0.00100	0.000064	0.001
53002BA	GOAT-MEAT BYPRODUCTS	0.050	P	0.000000	0.000			
	00 NOT SPECIFIED					0.01100	0.000000	0.000
53002BB	GOAT(ORGAN MEATS)-OTHER	0.050	P	0.000000	0.000			
	00 NOT SPECIFIED					0.01100	0.000000	0.000
53002FA	GOAT(BONELESS)-FAT	0.050	P	0.000000	0.000			
	23 COOKED-FRESH-BOILED					0.00300	0.000000	0.000
	25 COOKED-FRESH-FRIED					0.00300	0.000000	0.000
53002KA	GOAT(ORGAN MEATS)-KIDNEY	0.050	P	0.000000	0.000			
	00 NOT SPECIFIED					0.00330	0.000000	0.000

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CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
PYRIDABEN Caswell #129105 CAS No. A.I. CODE: 129105 CFR No.	FEEDING STUDY IN DOG NOEL= 0.0000 mg/kg 0.00 ppm LEL= 0.5000 mg/kg 0.00 ppm ONCO:		UF -->0 OPP RfD= 0.005000 EPA RfD= 0.000000		

COMMODITY CONTRIBUTION BY RAC FOR: NON-NURSING INFANTS (< 1 YEAR OLD)

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD
05003AA	NECTARINES	0.120	P	0.000000	0.000			
	10 RAW-FRESH OR NFS					0.05800	0.000000	0.000
05004AA	PEACHES-FRESH	0.120	P	0.250409	5.008			
	10 RAW-FRESH OR NFS					0.05800	0.010527	0.211
	21 COOKED-NFS					0.05800	0.000041	0.001
	31 COOKED-FRESH OR CANNED					0.05800	0.014092	0.282
	51 COOKED-CANNED					0.05800	0.096371	1.927
05004DA	PEACHES-DRIED	0.120	P	0.000000	0.000			
	10 RAW-FRESH OR NFS					0.05800	0.000000	0.000
	21 COOKED-NFS					0.05800	0.000000	0.000
05005AA	PLUMS(DAMSONS)-FRESH	0.120	P	0.035399	0.708			
	10 RAW-FRESH OR NFS					0.05800	0.000440	0.009
	31 COOKED-FRESH OR CANNED					0.05800	0.016670	0.333
05005DA	PLUMS-PRUNES(DRIED)	0.120	P	0.018245	0.365			
	10 RAW-FRESH OR NFS					0.05400	0.000000	0.000
	21 COOKED-NFS					0.05400	0.000020	0.000
	31 COOKED-FRESH OR CANNED					0.05400	0.008191	0.164
05005JA	PLUMS,PRUNE-JUICE	0.120	P	0.020412	0.408			
	10 RAW-FRESH OR NFS					0.05400	0.006561	0.131
	62 COOKED-FRESH OR FROZEN-BAKED					0.05400	0.000000	0.000
	CROP GROUP TOTALS FOR STONE FRUITS:			0.324465	6.489		0.152913	3.058
01014AA	GRAPES-FRESH	1.700	P	0.042052	0.841			
	10 RAW-FRESH OR NFS					0.47000	0.001716	0.034
	21 COOKED-NFS					0.47000	0.000000	0.000
	31 COOKED-FRESH OR CANNED					0.47000	0.009910	0.198
01014DA	GRAPES-RAISINS	1.700	P	0.030293	0.606			
	10 RAW-FRESH OR NFS					0.45000	0.000000	0.000
	21 COOKED-NFS					0.45000	0.000000	0.000
	22 COOKED-FRESH-BAKED					0.45000	0.001865	0.037
01014JA	GRAPES-JUICE	1.700	P	0.424696	8.494			
	10 RAW-FRESH OR NFS					0.02700	0.000889	0.018
	15 RAW-FRESH OR CANNED					0.02700	0.004396	0.088
	21 COOKED-NFS					0.02700	0.000335	0.007
	CROP GROUP TOTALS FOR SMALL FRUITS AND BERRIES:			0.497041	9.941		0.019111	0.382

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
PYRIDABEN Caswell #129105 CAS No. A.I. CODE: 129105 CFR No.	FEEDING STUDY IN DOG NOEL= 0.0000 mg/kg 0.00 ppm LEL= 0.5000 mg/kg 0.00 ppm ONCO:		UF -->0 OPP RfD= 0.005000 EPA RfD= 0.000000		

COMMODITY CONTRIBUTION BY RAC FOR: NON-NURSING INFANTS (< 1 YEAR OLD)

FOOD CODE	FOODNAME/FOODFORM	TOLERANCE (PPM)	TYPE	TMRC (UG/KG/DAY)	%RFD	ANTICIPATED RESIDUE (PPM)	ARC (UG/KG/DAY)	%RFD
02006JA	ORANGES-JUICE	1.200	P	5.707308	114.146			
	15 RAW-FRESH OR CANNED					0.03600	0.049673	0.993
	31 COOKED-FRESH OR CANNED					0.03600	0.045449	0.909
02007AA	TANGELOS	1.200	P	0.000000	0.000			
	10 RAW-FRESH OR NFS					0.37000	0.000000	0.000
02008AA	TANGERINES	1.200	P	0.002769	0.055			
	10 RAW-FRESH OR NFS					0.37000	0.000854	0.017
02008JA	TANGERINE-JUICE	1.200	P	0.000000	0.000			
	15 RAW-FRESH OR CANNED					0.03600	0.000000	0.000
	CROP GROUP TOTALS FOR CITRUS FRUITS:			6.044614	120.892		0.113946	2.279
04001AA	APPLES-FRESH	1.500	P	4.280994	85.620			
	10 RAW-FRESH OR NFS					0.63000	0.035693	0.714
	21 COOKED-NFS					0.63000	0.139751	2.795
	31 COOKED-FRESH OR CANNED					0.63000	1.615064	32.301
	62 COOKED-FRESH OR FROZEN-BAKED					0.63000	0.007509	0.150
04001DA	APPLES-DRIED	1.500	P	0.000000	0.000			
	10 RAW-FRESH OR NFS					0.63000	0.000000	0.000
	22 COOKED-FRESH-BAKED					0.63000	0.000000	0.000
	62 COOKED-FRESH OR FROZEN-BAKED					0.63000	0.000000	0.000
04001JA	APPLES-JUICE	1.500	P	7.794469	155.889			
	15 RAW-FRESH OR CANNED					0.05700	0.065110	1.302
	31 COOKED-FRESH OR CANNED					0.05700	0.132350	2.647
04003AA	PEARS-FRESH	1.700	P	2.682700	53.654			
	10 RAW-FRESH OR NFS					0.87000	0.059651	1.193
	31 COOKED-FRESH OR CANNED					0.87000	0.140420	2.808
	51 COOKED-CANNED					0.87000	1.172840	23.457
	62 COOKED-FRESH OR FROZEN-BAKED					0.87000	0.000000	0.000
04003DA	PEARS-DRIED	1.700	P	0.000000	0.000			
	10 RAW-FRESH OR NFS					0.87000	0.000000	0.000
	21 COOKED-NFS					0.87000	0.000000	0.000
	CROP GROUP TOTALS FOR POME FRUITS:			14.758163	295.163		3.368388	67.368

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
PYRIDABEN Caswell #129105 CAS No. A.I. CODE: 129105 CFR No.	FEEDING STUDY IN DOG NOEL= 0.0000 mg/kg 0.00 ppm LEL= 0.5000 mg/kg 0.00 ppm ONCO:		UF -->0 OPP RfD= 0.005000 EPA RfD= 0.000000		

POPULATION SUBGROUP	TOTAL TMRC (MG/KG BODY WEIGHT/DAY) CURRENT TMRC*	NEW TMRC**	NEW TMRC AS PERCENT OF RFD	DIFFERENCE AS PERCENT OF RFD	EFFECT OF ANTICIPATED RESIDUES ARC	%RFD
U.S. POPULATION - 48 STATES	0.004922	0.004922	98.444980	0.000000	0.000588	11.75226
U.S. POPULATION - SPRING SEASON	0.004605	0.004605	92.102100	0.000000	0.000508	10.15978
U.S. POPULATION - SUMMER SEASON	0.004484	0.004484	89.682180	0.000000	0.000485	9.69442
U.S. POPULATION - FALL SEASON	0.005274	0.005274	105.483740	0.000000	0.000685	13.69416
U.S. POPULATION - WINTER SEASON	0.005326	0.005326	106.513600	0.000000	0.000673	13.46026
NORTHEAST REGION	0.006161	0.006161	123.220760	0.000000	0.000669	13.38798
NORTH CENTRAL REGION	0.004787	0.004787	95.735480	0.000000	0.000630	12.59466
SOUTHERN REGION	0.003821	0.003821	76.416260	0.000000	0.000420	8.39180
WESTERN REGION	0.005360	0.005360	107.207900	0.000000	0.000707	14.14444
HISPANICS	0.006109	0.006109	122.173320	0.000000	0.000674	13.47274
NON-HISPANIC WHITES	0.004885	0.004885	97.693020	0.000000	0.000609	12.17754
NON-HISPANIC BLACKS	0.004447	0.004447	88.942100	0.000000	0.000389	7.77584
NON-HISPANIC OTHERS	0.006314	0.006314	126.288040	0.000000	0.000772	15.44172
NURSING INFANTS (< 1 YEAR OLD)	0.014610	0.014610	292.197080	0.000000	0.002929	58.58416
NON-NURSING INFANTS (< 1 YEAR OLD)	0.022385	0.022385	447.691000	0.000000	0.003682	73.64592
FEMALES (13+ YEARS, PREGNANT)	0.003711	0.003711	74.226740	0.000000	0.000460	9.19808
FEMALES 13+ YEARS, NURSING	0.004104	0.004104	82.083620	0.000000	0.000605	12.09534
CHILDREN (1-6 YEARS OLD)	0.014509	0.014509	290.182660	0.000000	0.001504	30.07096
CHILDREN (7-12 YEARS OLD)	0.007147	0.007147	142.943420	0.000000	0.000907	18.14478
MALES (13-19 YEARS OLD)	0.003725	0.003725	74.490300	0.000000	0.000430	8.59004
FEMALES (13-19 YEARS OLD, NOT PREG. OR NURSING)	0.003613	0.003613	72.262780	0.000000	0.000414	8.28774
MALES (20 YEARS AND OLDER)	0.002709	0.002709	54.171160	0.000000	0.000344	6.87688
FEMALES (20 YEARS AND OLDER, NOT PREG. OR NURS)	0.003333	0.003333	66.652960	0.000000	0.000389	7.77374

*Current TMRC does not include new or pending tolerances.
**New TMRC includes new, pending, and published tolerances.

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1DETAILED ACUTE ANALYSIS INCLUDING AR'S: ALL STATISTICS BASED ON USERS' DAILY CONSUMPTION 09:50 Wednesday, March 26, 1997 7

NAME: PYRIDABEN STUDY RDV NOEL SF STUDY TYPE SPECIES EFF. LEV. CORE GRADE DOC. NO.
*CASWELL NO: 129X CFR NO: CFR . A
*CAS NO: SHAUGHNESSY NO: 129105 B
*STATUS CODES: C
*RDV INFO: The LD value used in this analysis is 0.01 MG/KG of BODY WEIGHT/DAY
FILE INFO: No Tolerance Data Are Used--Without User Modifications. AR DATA: No User Modifications

-U.S. POP.--48 STATES

ESTIMATES BASED ON	ESTIMATED % OF POTENTIAL PERSON DAYS THAT ARE USER-DAYS	MEAN DAILY RESIDUE CONTRIBUTION PER USER-DAY MG/KG BODY WEIGHT/DAY	AS PERCENT OF RDV
TOLERANCES:	0.00	0.000000	0.00
ANTICIPATED RESIDUES:	30.24	0.001131	11.31

0

ESTIMATED % OF POPULATION USER-DAYS WITH RESIDUE CONTRIBUTION EXCEEDING X TIMES THE RDV, FOR X=

	0	.2	.4	.6	.8	1	1.2	1.4	1.6	1.8	2	3	4	5	10	15	20
TOLERANCES:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANTICIPATED RESIDUES:	100	15	6	3	2	1	1	0	0	0	0	0	0	0	0	0	0

0INFANTS(<1 YEAR)

ESTIMATES BASED ON	ESTIMATED % OF POTENTIAL PERSON DAYS THAT ARE USER-DAYS	MEAN DAILY RESIDUE CONTRIBUTION PER USER-DAY MG/KG BODY WEIGHT/DAY	AS PERCENT OF RDV
TOLERANCES:	0.00	0.000000	0.00
ANTICIPATED RESIDUES:	43.18	0.006852	68.52

0

ESTIMATED % OF POPULATION USER-DAYS WITH RESIDUE CONTRIBUTION EXCEEDING X TIMES THE RDV, FOR X=

	0	.2	.4	.6	.8	1	1.2	1.4	1.6	1.8	2	3	4	5	10	15	20
TOLERANCES:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANTICIPATED RESIDUES:	100	81	61	47	33	21	16	11	8	5	4	1	0	0	0	0	0

0CHILDREN(1-6 YRS)

ESTIMATES BASED ON	ESTIMATED % OF POTENTIAL PERSON DAYS THAT ARE USER-DAYS	MEAN DAILY RESIDUE CONTRIBUTION PER USER-DAY MG/KG BODY WEIGHT/DAY	AS PERCENT OF RDV
TOLERANCES:	0.00	0.000000	0.00
ANTICIPATED RESIDUES:	40.69	0.002718	27.18

0

ESTIMATED % OF POPULATION USER-DAYS WITH RESIDUE CONTRIBUTION EXCEEDING X TIMES THE RDV, FOR X=

	0	.2	.4	.6	.8	1	1.2	1.4	1.6	1.8	2	3	4	5	10	15	20
TOLERANCES:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANTICIPATED RESIDUES:	100	46	25	13	7	5	3	2	1	1	1	0	0	0	0	0	0

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Infants (< 1 year)

Exposure = RDV x X
= 0.01 x 4
High End Exposure = 0.04

MOE = Noel + Exposure
= 50 mg/kg/day + 0.04 mg/kg/day
MOE = 1250

Children (1-6 years)

Exposure = RDV x X
= 0.01 x 3
High End Exposure = 0.03

MOE = Noel + Exposure
= 50 mg/kg/day + 0.03 mg/kg/day
MOE = 1666

Females (13+ Years):

Exposure = RDV x X
= 0.01 x 0.6
High End Exposure = 0.006

MOE = Noel + Exposure
= 50 mg/kg/day + 0.006 mg/kg/day
MOE = 8333

Males (13+ Years):

Exposure = RDV x X
= 0.01 x 0.6
High End Exposure = 0.006

MOE = Noel + Exposure
= 50 mg/kg/day + 0.006 mg/kg/day
MOE = 8333