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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

MEMORANDUM

DATE: 9/26/96

SUBJECT: ID#96CA0039 & 96CA0040. SECTION 18 EXEMPTIONS FOR THE USE OF IMIDACLOPRID ON TURNIP GREENS AND GARDEN BEETS IN THE STATE OF CALIFORNIA.

DP Barcode: D229539 & D229537
Caswell: 497E
Trade Name: Provado
Chem#: 129099
Reg#: 3125-457
40 CFR: §180.472 & §186.900
Class: Insecticide

TO: M. Collantes/ R. Forrest, PM Team 41
ERMUS/RSB/RD (7505W)

FROM: William D. Cutchin, William Dykstra, Charles Lewis
Pilot Interdisciplinary Risk Assessment Team
RCAB/HED (7509C)

THRU: Michael S. Metzger, Acting Chief
RCAB/HED (7509C)

INTRODUCTION

The California Environmental Protection Agency is proposing emergency exemptions for the use of imidacloprid on turnip greens and table beets (garden beets) for control of aphids. These are the first §18 requests for these uses. The proposed program will entail application of 19.3 gallons of Provado, 30.9 lbs ai, on 132 acres in the counties of Alameda and Stanislaus, during the period August 5, 1996 to August 4, 1997.

RECOMMENDATION

Garden Beets. Occupational exposure and dietary risk estimates do not exceed HED's level of concern. This §18 exemption should not pose an unacceptable risk to infants and children. HED has no objection to the issuance of the Section 18 exemption for the use of imidacloprid on garden beets in the State of California. A

time-limited tolerance at 0.3 ppm on garden beet roots and 3.5 ppm on garden beet tops should be established to support this Section 18 crisis exemption.

Turnips. HED recommends **against** this request for the use of imidacloprid on turnips. The requested use pattern will result in imidacloprid residues in turnip roots as well as turnip greens. **The petitioner must request a §18 tolerance on turnip roots at 0.3 ppm in addition to the requested 3.5 ppm tolerance on turnip greens (tops).** HED would have no objection to the issuance of the §18 exemption for the use of imidacloprid on turnips provided the additional tolerance is requested, because occupational exposure and dietary risk estimates do not exceed HED's level of concern and because this §18 should not pose an unacceptable risk to infants and children. If the §18 request is revised as requested, a time-limited tolerance at 0.3 ppm on turnip roots and 3.5 ppm on turnip greens (tops) should be established.

CONCLUSIONS

Hazard Assessment

1. Occupational Exposure Endpoint Selection

   a) Short- and Intermediate-Term Risk. For short and intermediate-term MOE calculations, the TES Committee (4/18/94) determined that available data do not demonstrate that imidacloprid has dermal or inhalation toxicity potential. Therefore, short term or intermediate-term dermal and inhalation risk assessments are not required.

   b) Chronic Risk. Chronic MOE calculations are not required since a chronic exposure scenario has not been identified for these §18 uses and the TES Committee did not recommend use of a chronic toxicological endpoint.

   d) Cancer Risk. Imidacloprid has been classified as a Group E [no evidence of carcinogenicity in humans] by the RfD/Peer Review Committee (4/22/93).

   e) Dermal Penetration. Dermal penetration studies are not required for this action.

2. Dietary Endpoint Selection

   a) Acute Risk. The TES Committee recommended use of the NOEL of 24 mg/kg/day, based on decreased body weight, increased resorptions, increased abortions, and increased skeletal abnormalities (MRID No. 42256339) at the LEL of 72 mg/kg/day, from the developmental toxicity study in rabbits. This risk assessment should evaluate acute

dietary risk to females 13+ and older.

b) Chronic Risk. RfD = 0.057 mg/kg/day. The RfD was established based on 2-year rat feeding/carcinogenicity study (MRID No. 42256331, 42256332) with a NOEL of 5.7 mg/kg/day and an uncertainty factor of 100 based on increased thyroid lesions in males at the LEL of 16.9 mg/kg/day.

c) Cancer Risk. Imidacloprid has been classified as a Group E [no evidence of carcinogenicity in humans] by the RfD/Peer Review Committee (4/22/93).

d) Infants and Children

i) Developmental Studies

Rat - From the rat developmental study (MRID # 42256338), the maternal (systemic) NOEL was 30 mg/kg/day, based on decreased weight gain at the LOEL of 100 mg/kg/day. The developmental (pup) NOEL was 30 mg/kg/day, based on increased wavy ribs at the LOEL of 100 mg/kg/day.

Rabbit - From the rabbit developmental study (MRID # 42256339), the maternal (systemic) NOEL was 24 mg/kg/day, based on decreased body weight, increased abortions, and death at the LOEL of 72 mg/kg/day. The developmental (pup) NOEL was 24 mg/kg/day, based on decreased body weight and increased skeletal anomalies at the LEL of 72 mg/kg/day.

ii) Reproduction Studies

Rat - From the rat reproduction study (MRID # 42256340), the maternal (systemic) NOEL was 55 mg/kg/day (HDT). The reproductive/developmental (pup) NOEL was 8 mg/kg/day, based on decreased pup body weight during lactation in both generations at the LEL of 19 mg/kg/day.

Occupational Exposure

1. The TES Committee (4/18/94) recommended that available data do not demonstrate that imidacloprid has dermal or inhalation toxicity potential. Therefore, short- or intermediate-term dermal and inhalation risk assessments have not been prepared.

2. RD should insure that proposed work clothing and personal protective equipment (PPE) appearing on the label are in compliance with the Worker Protection Standard (WPS).

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Dietary Exposure

1. The nature of the residue of imidacloprid in plants and animals is adequately understood. The residues of concern are imidacloprid, (1-[(6-chloro-3-pyridinyl)methyl]-N-nitro-2-imidazolidin-imine), and its metabolites containing the 6-chloropyridine moiety expressed as parent as specified in 40 CFR §180.472.

2. Adequate enforcement methodology, HPLC, is available to enforce the tolerance expression. Bayer method 00357 has been shown to be suitable for enforcement purposes (PP#s 5F4480 and 3F4169, CBTS# 16601, DP Barcode D221591, F. Griffith, 12/18/95). A copy of this method may be obtained from PRPRB/FOD.

3a. Residues of imidacloprid are not expected to exceed 3.5 ppm in garden beet tops and 0.3 ppm in garden beet roots as a result of this Section 18 use. Time-limited tolerances should be established at these levels.

3b. Turnips to be treated for this §18 are grown both for the leafy tops and tops and roots, 25% and 75% of production, respectively (personal comm., B. Schnieder, 9/20/96). While the residues of imidacloprid are not expected to exceed 3.5 in turnip greens (tops), residues are also expected in turnip roots from this proposed use. A time-limited tolerance for turnip greens cannot be established until a tolerance for turnip roots is also proposed. **PIRAT recommends that the petitioner propose a §18 tolerance on turnip roots at 0.3 ppm.**

4. Secondary residues in animal commodities are not expected to exceed existing tolerances as a result of these Section 18 uses.

5. Dietary exposure estimates (DRES) for imidacloprid are summarized in the Appendix.

   a) Acute Dietary Risk. The acute dietary exposure endpoints of concern for imidacloprid are decreased body weight, increased resorptions, increased abortions, and increased skeletal abnormalities. For the population subgroup of concern, females 13+ and older, the calculated Margin Of Exposure (MOE) value is 480. Values below 100 are of concern to HED.

   b) Chronic Dietary Risk. The existing imidacloprid tolerances (published and pending) plus proposed Section 18 use result in a Theoretical Maximum Residue Contribution (TMRC) that is equivalent to the following percentages of the RfD:

      U.S Population (48 states) 15.0%

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Nursing Infants	12.2%
Non-Nursing Infants (<1 year old)	30.3%
Children (1-6 years old)	31.0%
Children (7-12 years old)	23.0%

c) Dietary Cancer Risk. Imidacloprid has been classified as a Group E [no evidence of carcinogenicity in for humans] by the RfD/Peer Review Committee. Based on this finding, a quantitative dietary cancer risk assessment was not performed.

d) Anticipated Residues. Because the existing imidacloprid tolerances (published and pending) plus proposed Section 18 uses do not result in TMRCs that exceed the RfD for the US general population or any of the 22 subgroups analyzed, there is no need for anticipated residue assessment refinement.

Aggregate Exposure

1) Water - Review of terrestrial field dissipation data by the Environmental Fate and Effects Division indicates that imidacloprid is persistent and leaches into groundwater. There is no established Maximum Concentration Level for residues of imidacloprid in drinking water. No drinking water health advisories have been issued for imidacloprid. The "Pesticides in Groundwater Database (EPA 734-12-92-001, September 1992) has no information concerning imidacloprid. Based on the available data, PIRAT does not anticipate that there will be significant exposure to the general population from imidacloprid residues in drinking water.

2) Non-occupational Exposure - Imidacloprid is registered for turf pest control. Concerning acute risks from non-occupational exposure, PIRAT does not consider it likely that an individual would experience an acute dietary and acute residential exposure event at the same time. For short term risks, PIRAT acknowledges that there may be short-term residential exposure scenarios, however no acceptable reliable data to assess these potential risks are available at this time. For chronic risks, PIRAT does not anticipate a chronic exposure scenario resulting from residential uses.

Cumulative Effects

At this time, PIRAT concludes that insufficient information is available to consider cumulative effects of imidacloprid and other substances that may have a common mode of toxicity. For purposes of this Section 18 only, PIRAT is considering only the potential risks of imidacloprid in its aggregate exposure.

Determination of Safety for Infants and Children

The toxicological database for evaluating pre- and post-natal toxicity for imidacloprid is complete. In the case of the developmental studies, the developmental and maternal NOELs for both rats and rabbits occur at the same dose level for each species (24 mg/kg/day for rabbits and 30 mg/kg/day for rats) which suggests that there are no special prenatal sensitivities for unborn children in the absence of maternal toxicity. However, a detailed analysis of the developmental studies indicates that the skeletal findings (wavy ribs and other anomalies) in both the rat and rabbit fetuses are severe malformations which occurred in the presence of slight toxicity (decreases of body weight) in the maternal animals. Additionally, in rabbits, there were resorptions and abortions which can be attributed to acute maternal exposure. This information has been interpreted by the Toxicology Endpoint Selection Committee (TESC) as indicating a potential acute dietary risk for pre-natally exposed infants. The acute dietary MOE for women 13 years or older is 480. This large MOE demonstrates that the prenatal exposure to infants is not a toxicological concern at this time.

In the case of the 2-generation rat reproduction study, the maternal NOEL is 55 mg/kg/day and the NOEL for decreased pup body weight during lactation is 8 mg/kg/day with the LOEL at 19 mg/kg/day. Therefore, this study shows that adverse postnatal development of pups occurs at levels (19 mg/kg/day) which are lower than the NOEL for the parental animals (55 mg/kg/day). Therefore, the pups are more sensitive to the effects of imidacloprid than parental animals. The pup NOEL of 8 mg/kg/day in the reproduction study is slightly greater than the NOEL of 5.7 from the 2 year rat feeding study which was the basis of the RfD. The TMRC value for the most highly exposed infant and children subgroup (children 1-6 years old) occupies 31.0% of the RfD.

Both chronic and acute dietary exposure risk assessments assume 100% crop treated and use tolerance level residues for all commodities. Refinement of these dietary risk assessments by using percent crop treated and anticipated residue data would greatly reduce dietary exposure. Therefore, both of these risk assessments are also an over-estimate of dietary risk. Consideration of anticipated residues and percent crop treated would likely result in an anticipated residue contribution (ARC) which would occupy a percent of the RfD that is likely to be significantly lower than the currently calculated TMRC value. Additionally, the acute dietary MOE would be greater than the current MOE. This provides an adequate safety factor for children during prenatal and postnatal development.

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Should an additional uncertainty factor be deemed appropriate, when considered in conjunction with a refined exposure estimate, it is unlikely that the dietary risk will exceed 100 percent of the RfD and the MOE would likely be greater than the currently calculated value. Therefore, HED concludes that this Section 18 should not pose an unacceptable risk to infants and children.

Dietary Exposure

Table 1. Residue Consideration Summary Table

PARAMETER	PROPOSED USE	RESIDUE DATA	
CHEMICAL	imidacloprid	imidacloprid	imidacloprid
FORMULATION	Provado	Confidor	Admire
CROP	garden beets (tops and roots) and turnip greens (tops and roots)	potatoes	leaf and head lettuce
TYPE APPLICATION	ground (5-100 gal/A) or air (5-20 gal/A)	ground (5-100 gal/A)	ground (5-100 gal/A)
# APPLICATIONS	5	4	5
TIMING	Apply before damaging applications become established with 5-day application intervals, 7-day PHI.	Apply as pests begin to build with 7-day application interval, 7-day PHI.	5-day application interval, 7-day PHI
RATE/APPLICATION	0.05 lb ai (3.75 fl oz form.)/A	0.05 lb ai (3.75 fl oz form.)/A	0.05 lb ai (3 fl oz form.)/A
RATE/YEAR or SEASON	0.25 lb ai (18.75 fl oz form.)/A/year	0.2 lb ai (15 fl oz form.)/A/season	0.25 lb ai (15 fl oz form.)/A/year
MAXIMUM RESIDUE	N/A	0.28 ppm	2.49
RESTRICTIONS	Follow all applicable directions, restrictions, and precautions on the USEPA registered label.	Do not apply directly to water. Immediate plant-back to cotton, potatoes, and sorghum, all others after 12 months.	Do not apply directly to water. Immediate plant-back to cotton, potatoes, and sorghum, all others after 12 months.
RESIDUE DATA SOURCE	N/A	PP#3F4149, 9/21/93	PP#3F4231, 6/22/94
PERFORMING LAB	N/A	Miles Laboratories	Miles Laboratories

Attachments: DRES Analysis (9/24/96)

cc with Attachments: Cutchin, PIRAT, DRES (B. Steinwand), RCAB (D. McCall)
cc without Attachments: Dykstra, Lewis, OREB (Chem File), Caswell File, TOX (Ottley), CBTS (Sect 18)
RDI:PIRAT: 9/25/96