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

FEB 29 1996

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

Subject: **ID # 3125-422 - IMIDACLOPRID ON TOBACCO.**
Amended Registration Request and the February 26, 1996 Amendment.
(MRID #s 436751-01 and 437155-01) [CBTS #s 15941 and 15942]
{DP Barcode D217632 and D217634}

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Introduction

Bayer Corporation, Agricultural Division, in a letter dated May 31, 1995, signed by John S. Thornton, proposes to amend the registrations of Admire® 2 F and Provado® 1.6 F to add non-food uses on tobacco. In the February 26, 1996, amendment the registrant revised both labels adding a 14 day PHI and provided a written summary of the magnitude of the imidacloprid residue data on green and cured tobacco leaves.

CONCLUSIONS

1. CBTS Conclusion on **Directions for Use**

The registrant has proposed an adequate set of directions for use of imidacloprid formulated as Admire® 2 F and Provado® 1.6 F on tobacco in the February 26, 1996, amendment.

2. CBTS Conclusion on the **Nature of the Residue**

The nature of the residue in tobacco is adequately understood. The metabolism follows the same pathways and has the same metabolites as in food crops. The HED Metabolism Committee concluded that the residues to be regulated are combined residues of imidacloprid and its metabolites containing the 6-chloropyridinyl moiety, all calculated as imidacloprid. CBTS has no further concerns on the results of the imidacloprid on tobacco metabolism study.

3. CBTS Conclusion on the **Magnitude of the Residue - Crop Field Trials**

The petitioner needs to submit the final complete results of the 5 tobacco crop field trials. Based on the summary of the crop field trial data CBTS tentatively concludes that total imidacloprid residues on tobacco leaves are not expected to exceed 7 ppm on green tobacco leaves and 31 ppm on cured tobacco leaves when Admire and/or Provado is used as directed.

4. CBTS Conclusion on the **Pyrolysis Study**

CBTS concludes that the petitioner has conducted an adequate pyrolysis study using ^{14}C-imidacloprid treated air cured tobacco leaves made into filterless cigarettes. The petitioner has characterized and identified the components of the radioactive residue (RR) in the cigarette butt, mainstream smoke (MS), and sidestream smoke (SS). The identified components are the same and at similar ppm levels as reported to the HED Metabolism Committee for the other 6 metabolism studies (see memoranda in PP # 3F4169 by F. Griffith dated June 18 and 23, 1993). CBTS has no further concerns on the results of the pyrolysis study.

RECOMMENDATION

CBTS cannot recommend for a permanent registration for use of imidacloprid on tobacco for the reasons cited in our Executive Summary and further described in Conclusion 3 above.

TOX considerations permitting, CBTS can recommend for a one year conditional registration on tobacco to allow Bayer time to complete and report its crop field trial studies. Total imidacloprid residues on green tobacco leaves are not expected to exceed 7 ppm and not to exceed 31 ppm on cured tobacco leaves.

DETAILED CONSIDERATIONS

DIRECTIONS FOR USE

Imidacloprid is proposed for use as an insecticide to control aphids, fleabeetles, Japanese Beetles, wireworms, and mole crickets on tobacco. For use on tobacco the petitioner proposes foliar

applications of Provado® 1.6 Flowable (EPA Reg. No. 3125-457) containing 1.6 lbs imidacloprid ai/gal or 17.4% ai. Apply 4 fl oz (0.05 lb ai) Provado/acre/application as a broadcast, or directed foliar spray with a 7 day repeat application interval not to exceed 5 applications or 22 fl ozs Provado (0.28 lb ai imidacloprid)/acre per growing season. An organosilicone based spray adjuvant may be added at the manufacture's suggested use rate to improve imidacloprid coverage. No PHI is proposed. The February 26 amendment added a 14 day PHI.

For use on tobacco the petitioner proposes foliar applications of Admire® 2 Flowable (EPA Reg. No. 3125-422) containing 2 lbs imidacloprid ai/gal or 21.4% ai. Apply 1.5 to 3 fl oz (0.025-0.05 lb ai) Admire/acre/application as a broadcast, or directed foliar spray with a 7 day repeat application interval not to exceed 6 applications, or 18 fl ozs Admire (0.28 lb ai imidacloprid)/acre per growing season. An organosilicone based spray adjuvant may be added at the manufacture's suggested use rate to improve imidacloprid coverage. A soil application for Admire on tobacco plants is proposed at a rate of 0.7 to 2.8 fl ozs Admire (0.012-0.048 lb ai imidacloprid)/1000 plants in the transplant water, or as a uniform broadcast application, or drench to trays/flats prior to transplanting. There is a 14 day PHI.

On both labels the only restriction is not to apply more than 0.5 lb ai imidacloprid/acre/season regardless to the formulation, use, or manner of application.

The registrant has proposed an adequate set of directions for use of imidacloprid formulated as Admire® 2 F and Provado® 1.6 F on tobacco in the February 26, 1996, amendment.

NATURE OF THE RESIDUE (MRID # 437155-01)

The petitioner presented the results of an imidacloprid on tobacco metabolism study in a document titled "Metabolism of NTN 33893 in Tobacco" by T. Clark and A. Brauner dated October 12, 1994, and coded Bayer (Miles) report number 106631.

The petitioner used [pyridinyl-^{14}C-methyl] imidacloprid formulated as a 25 WP and applied at a rate of 20 mg per plant to the soil of greenhouse tobacco plants, and 3 foliar applications at a rate of 2.8 mg/plant (106 grams ai/ha/application) with a harvest 14 days after the last application. Tobacco leaves were analyzed by acceptable analytical techniques to determine the total ^{14}C-imidacloprid and to characterized and identify the components of the total radioactive residue (TRR).

Total radioactive residues in unextracted tobacco leaves were 10.2 ppm. Extraction of the tobacco leaves recovered 9.97 ppm. The unextracted 0.23 ppm was not investigated further. Identification of the components showed 7.93 ppm (77.7%) was the parent imidacloprid, 0.07 ppm (0.7%) of the ring open guanidine metabolite, 0.58 ppm (5.7%) of the guanidine metabolite, 0.22 ppm (2.1%) of the urea metabolite, 0.1 ppm (1%) each of the nitrosimine, olefin, 4-hydroxy

metabolites, 0.41 ppm (4%) of the 5-hydroxy metabolite, 0.09 ppm (0.9%) of 6-chloronicotinic acid (6-CNA), and 0.04 ppm (0.4%) of the glucoside of 6-CNA.

In summary, imidacloprid in tobacco plants is metabolized by 3 pathways as follows:

1) hydroxylation of the dihydroimidazole ring of imidacloprid to form 4-hydroxy imidacloprid and 5-hydroxy imidacloprid followed by the loss of water to form the olefin metabolite,

2) reduction and loss of the nitro group on the dihydroimidazole ring to form the nitrosimino imidacloprid, then the guanidine and urea imidacloprid, and finally the ring open guanidine imidacloprid, and

3) bridge cleavage of the C-N bond to form 6-CNA, which rapidly forms the glucoside, and dihydroimidazole.

The nature of the residue in tobacco is adequately understood. The metabolism follows the same pathways and has the same metabolites as found in food crops. The HED Metabolism Committee concluded that the residues to be regulated are combined residues of imidacloprid and its metabolites containing the 6-chloropyridinyl moiety, all calculated as imidacloprid. CBTS has no further concerns on the results of the imidacloprid on tobacco metabolism study.

MAGNITUDE OF THE RESIDUE - CROP FIELD TRIALS

In the original amendment registration request Bayer did not present the results from any field trials. During a telcon (D. Griffith, EPA, to K. Cain, Bayer on February 14, 1996) CBTS learned there are results from at least 5 field trials that show total imidacloprid residues not exceeding 7 ppm on green tobacco leaves at a 14-day PHI.

In the February 26, 1996, amendment the registrant presented the summary of the 5 tobacco field trials. The trials were conducted in North Carolina, South Carolina, and Georgia (3 trials in Region II); and 2 trials in Kentucky (Region V). In each field trial tobacco plants were treated with Admire 2 Fat a rate of 0.02 lb ai imidacloprid at transplanting followed by 3 foliar applications at a rate of 1.5 ozs ai imidacloprid per acre per application. Green tobacco leaves were harvested at 0, 7, 14, and 21 days after the third application. At 14 days PHI total imidacloprid residues ranged from 0.09 ppm to 4.1 ppm, averaging 2.5 ppm $\pm$ 1.2 ppm on green tobacco leaves. On cured tobacco leaves total imidacloprid residue ranged from 15.2 to 30.7 ppm, averaging 21.9 $\pm$ 5.9 ppm.

The petitioner needs to submit the final complete results of the 5 tobacco crop field trials. Based on the summary of the crop field trial data CBTS tentatively concludes that total imidacloprid residues on tobacco leaves are not expected to exceed 7 ppm on green tobacco leaves and 31 ppm on cured tobacco leaves when Admire and/or Provado is used as directed. With this information we can recommend

for a conditional registration of imidacloprid on tobacco to allow the petitioner time to complete and submit the results of all 5 tobacco crop field trials to the Agency.

PYROLYSIS STUDY (MRID # 436751-01)

The petitioner presented the results of an imidacloprid in tobacco smoke study in a document titled "Recovery of Imidacloprid and its Metabolites in Tobacco Smoke of Cigarettes Made from Imidacloprid Treated Tobacco" by G. Schepers dated September 30, 1994, and coded Bayer (Miles) report number 106631-1.

^{14}C-imidacloprid treated tobacco leaves from the metabolism study were air cured for 4 months and made into filterless cigarettes. The cigarettes were smoked on a single port smoking machine with the mainstream smoke (MS) and sidestream smoke (SS) being trapped separately for analysis. The ash and butt were recovered and analyzed. Air cured tobacco leaves, filterless cigarettes, SM, SS, ash, and butt were analyzed by acceptable analytical techniques to determine the total ^{14}C-imidacloprid and to characterize and identify the components of the TRR.

The TRR as imidacloprid equivalents in the air cured tobacco leaves was 126.4 ppm, 10.2 ppm in MS, 60.3 ppm in SS, 49.6 ppm in the butt, and 6.3 ppm in ash. Of the recovered radioactivity 34.6% was identified as CO_2 and 0.5% as CO.

In the butt 35.8 ppm was imidacloprid, per se. The guanidine imidacloprid was observed at 1.6 ppm, the urea imidacloprid was observed at 1.5 ppm, the olefin imidacloprid was observed at 2.8 ppm, the nitrosimine imidacloprid was observed at 0.4 ppm, and the 4-OH imidacloprid was observed at 2.1 ppm. 3.3 ppm was diffuse radioactivity which CBTS agrees need not be identified further.

In the MS particle filter 1.5 ppm was shown to be imidacloprid, 2 ppm was urea imidacloprid, 1.7 ppm was diffuse radioactivity, and 2 unidentified compounds were observed at 0.2 and 0.4 ppm. The SS particle filter contained 1 ppm imidacloprid, 2.5 ppm urea imidacloprid, 3 ppm diffuse radioactivity, and 2 unidentified compounds at levels of 0.4 and 0.5 ppm. The gas/vapor phase contained 43.7 ppm $^{14}CO_2$ and 0.6 ppm ^{14}CO.

CBTS concludes that the petitioner has conducted an adequate pyrolysis study using ^{14}C-imidacloprid treated air cured tobacco leaves made into filterless cigarettes. The petitioner has characterized and identified the components in the cigarette butt, MS, and SS. The identified components are the same and at similar ppm levels as those observed in the submitted metabolism studies. CBTS has no further concerns on the results of the pyrolysis study.

cc:R.F.,Circu.,Reviewer(FDG),ImidaclopridSub.File,TOX.
7509C:CBTS:Reviewer(FDG):CM#2:Rm804Q:305-5826:FDG:2/20/96:edit:fdg:2/29/96.
RDI:TPT-1:2/28/96:BrSrSci:RALoranger(RBP):2/28/96:ActBrCh:EZager:2/29/96.