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

MAY 8 1986

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: PP6E3391: Fenvalerate (Pydrin) in or on Turnip Roots and Tops. Evaluation of Analytical Method and Residue Data. EPA ACCESSION NUMBER 262240. [RCB #794].

TO: H. Jamerson, PM 43
Registration Division (TS-767)

and

Toxicology Branch
Hazard Evaluation Division (TS-769)

THRU: Charles L. Trichilo, Chief
Residue Chemistry Branch
Hazard Evaluation Division (TS-769)

FROM: R. W. Cook, Chemist
Residue Chemistry Branch
Hazard Evaluation Division (TS-769)

The petitioner, G. M. Markle, National Coordinator, and R. H. Kupelian, National Director, Interregional Research Project No. 4, State Agricultural Experiment Station, Rutgers Universtiy, New Brunswick, New Jersey, on behalf of the IR-4 Technical Committee and the Agricultural Experiment Stations of California, Indiana, North Carolina, Oklahoma, and Washington, propose tolerances for residues of the insecticide fenvalerate [cyano(3-phenoxyphenyl)-methyl-4-chloro-alpha-(methylethyl)benzeneacetate in or on turnip roots at 0.5 ppm and in or on turnip tops at 20 ppm.

A Registration Standard does not exist for fenvalerate at this time. Residues of fenvalerate are currently regulated under 40 CFR 180.379 in or on a variety of raw agricultural commodities. A number of tolerances for fenvalerate are currently pending.

In 40 CFR 180.34 (9), turnips roots are a member of the crop group (I) Root and Tuber Vegetables, while turnip tops are members of the group (II) Leaves of root and tuber vegetables (human food or animal feed) group. Representative crops of group (I) are carrot, potato, radish, and sugar beet, while representatives of group (II) are turnip and sugar beet. Tolerances are established on group (I) members as follows: radish roots, 0.3 ppm; and potatoes, 0.02 ppm.

Tolerances are currently pending for carrots at 0.5 ppm and sugar beet roots at 0.5 ppm. Under group (II), tolerances are established at 8 ppm in radish tops and proposed at 10 ppm in sugarbeet tops. If or when tolerances as proposed herein are established, residue data will be available for representative crops for both (I) and (II). However, since the potato tolerance is 0.02 ppm and other tolerances are at 0.5 ppm, there is a 25-fold difference in tolerance levels. A crop group tolerance is not considered practical due to the 25-fold difference in tolerance levels.

A letter of authorization dated March 14, 1986, from E. L. Hobson, Ph. D., Washington Representative, Regulatory Affairs, HS&E, Shell Oil Company, to Hoyt Jamerson, RD, OPP, authorizes the Agency to refer to PYDRIN® Insecticide 2.4 EC (EPA Reg. No. 201-401) and Technical PYDRIN® Insecticide (EPA Reg. No. 201-402) in support of the IR-4 petition for tolerances of fenvalerate on turnips.

Conclusions:

1. The nature of the residue in turnips is adequately understood. The residue of concern in plants and livestock (except poultry) is the parent compound fenvalerate.

2. Adequate analytical methodology is available in PAM for enforcement purposes.

3.a. Provided the use directions limit application to ground equipment only, residues of fenvalerate will not exceed the proposed tolerance level of 0.5 ppm in roots, or 20 ppm in top from the use as proposed.

3b. Adequate geographic representation is available for the proposed use.

4a. Turnips are an insignificant livestock feed item, and would contribute only insignificant amounts to animal dietary burdens. Current meat and milk tolerances are adequate to cover this insignificant additional burden.

4b. Turnips are not a poultry feed item and there will be no problem of secondary residues in poultry tissue and eggs.

5. Codex limits have have not been established for fenvalerate on turnips and there will be no problems of compatibility. A Codex sheet is attached.

Recommendations:

TOX and EAB considerations permitting, and provided the use directions are limited to ground application only, we recommend for the establishment of the proposed tolerances for residues of the insecticide fenvalerate [cyano(3-phenoxyphenyl)methyl-4-chloro-alpha-(methylethyl)benzeneacetate in or on turnip roots at 0.5 ppm and in or on turnip tops at 20 ppm.

DETAILED CONSIDERATIONS:

Formulation:

The formulation proposed for use is formulated as PYDRIN 2.4 EC, EPA Reg. No. 201-401. It is an emulsifiable concentrate formulation containing 30% fenvalerate. The formulation inerts are cleared under 40 CFR 180.1001. We have previously concluded residue problems are not anticipated from manufacturing impurities or inerts.

Directions for Use: Turnips:

For armyworms, flea beetles, loopers, diamond-back moths, and imported cabbage worm, apply 0.1 to 0.2 lbs. a.i./A. Spray as needed to acheive control. Repeat at 7 to 10 day intervals. Do not exceed 1.6 lbs.a.i./A per season. Do not apply within 7 days of harvest.

The use directions should include instructions to apply fenvalerate by ground equipment only.

Nature of the Residue:

Plants:

No new plant metabolism studies are submitted. Plant metabolism studies have been reported on cotton (E. L. Gunderson, 5/14/78, PP6G1755), apples and lettuce (E. L. Gunderson, 6/21/78, PP8E2024), tomatoes (K. Arne, 1/7/81, PP1F2367), and soybeans (K. Arne, 12/23/80, PP0F2375) and small grains (PP4F3021/FAP4H5423, E. T. Haeberer, 5/3/85). The major residue in these studies is the parent compound fenvalerate. A photodegradate, 4-chloro-beta-(1-methylethyl)-alpha-(3-phenoxyphenyl)benzenepropanenitrile, has been determined by TOX (A. Kocialski, 7/19/84) to be not significant from current uses. We would expect that metabolism in turnip plants to proceed along the pathways previously identified. The nature of the residue in plants is adequately understood. We reiterate our conclusion that the residues of concern in plants is the parent compound fenvalerate.

Animals:

Turnips may be fed to livestock but are not a significant feed item. The metabolism of fenvalerate in cattle has been previously reported and reviewed (PP7F2013, E. L. Gunderson, 6/15/78; PP0F2367/FAP0H5266, K. Arne, 1/5/82). The major pathway of metabolism produces 4-chloro-alpha-(1-methylethyl)benzeneacetic acid and 3-phenoxybenzoic acid via cleavage at the ester linkage. Additional metabolism proceeds to 4-chloro-alpha-(2-hydroxy-1-methylethyl)benzeneacetic acid. TOX (A. Kocialski, 2/8/82) has concluded that these metabolites are not of toxicological concern. Thus, we reiterate our conclusion that the residue of concern in livestock is the parent compound fenvalerate.

Turnips are not used as a poultry feed.

Analytical Methods:

The analytical method is the PAM II method, MMS-R-478-1A, for which a successful trial was conducted on cottonseed in conjunction with PP7F2013 (J. Onley, 7/24/78). In brief, the blended crop substrate is extracted with hexane/isopropanol followed by partitioning into acetonitrile. After quantitative transfer to hexane, the sample is cleaned up on Florisil column and analyzed by GLC using electron capture detector. The two diastereomers are separately measured and calculated as fenvalerate. We conclude that adequate methods are available for enforcement purposes.

Recovery:

Turnip samples were fortified with fenvalerate at levels between 0.1 and 5.0 ppm. Recoveries ranged from 80% to 114% in the turnip tops, and 100 to 105% in roots. Additionally, recovery of the photodegradate in greens is reported at 100 to 101% at 0.05 to 0.5 ppm levels. The data indicate adequate recovery of fenvalerate through the analytical procedure.

Storage Stability:

Turnip tops (2) and roots (1) obtained in the OK study were fortified with fenvalerate at 0.1 and 0.5 ppm a few days after harvest, prior to freezer storage for 17 months before analysis. Recovery of fortified storage samples ranged 88% to 110% for greens, but the root sample showed 60% recovery after long term freezer storage. The data indicate adequate recovery of fenvalerate from long term storage of turnip samples.

Residue Data:

The number of applications ranged from 3 to 8 applications, at dosage rates of 0.2 to 0.4 pounds (1X to 2X) active per acre

[0.2 lb/A only at the 8 treatment schedule]. The interval between applications was shorter in the 8 treatment schedule (3-7 days) than in the 3 treatment schedule (15-30 days). Samples of turnip tops (all five trials) and roots (OK, IN, WA only) were obtained at 3, 7, and 10 days after last application.

Maximum residues in roots were 0.23 ppm (IN, 10 days PHI, 6 applications @ 0.2 lb/A) while tops showed 5.85 ppm. Residues from 2x application in this trial were 0.38 ppm roots and 5.3 ppm in tops. Other root values ranged from §0.01 to 0.17 ppm.

Maximum levels of fenvalerate in turnip tops, 16 ppm, were found in the CA trial receiving 8 applications of 0.2 pounds active at 3 to 7 day intervals and harvested at 7 days after last application. Roots were not examined in this trial.

Residues of the fenvalerate photodegradate SD54597 (not considered of TOX concern; see above) are reported in turnip tops at levels from 0.05 to 0.8 ppm in the IN and WA trials, and 1.7 ppm in the CA trial. Residues of the photodegradate in roots are not reported.

Turnips are a minor crop, with an estimated acreage of 12,708 harvested acres (1973, Fruit and Vegetable Facts and Pointers, United Fresh Fruit and Vegetable Association). While the geographic representation of the residue data for fenvalerate on turnips is somewhat limited, residue data are available for fenvalerate on other root and tuber crops, such as radish and potato established) and carrots and sugarbeets (proposed). In light of this other data, we are not raising the issue of representative geographical data.

We conclude that residues of fenvalerate are not likely to exceed the proposed tolerance level of 0.5 ppm in the raw agricultural commodity turnip roots or 20 ppm in turnip tops from the use as proposed herein.

Processed Turnip Fractions:

There are no processed turnip fractions, and therefore, no concern of concentration and further, no food additive tolerance is needed.

Residues in Meat, Milk, Poultry, and Eggs:

Turnips are an insignificant livestock feed item, and would contribute only insignificant amounts to animal dietary burdens. Further, current meat and milk tolerances are adequate to cover this insignificant additional burden. Turnips are not a poultry feed and there will be no problem of secondary residues in poultry tissue and eggs.

OTHER CONSIDERATIONS:

International Tolerances:

There are no Codex, Canadian, or Mexican tolerances for residues of fenvalerate on turnips and we do not anticipate any compatibility problems. A Codex sheet is attached.

Attachment 1: International Residue Limit Status Sheet.
cc: R.F., Circu, R. W. Cook, PP#6F3391, PMSD(ISB), TOX, EAB, EEB, FDA, F. Boyd.
TS-769:RCB:Reviewer:RWCook:Date:5/1/86:CM#2:RM:810:557-7324
RDI:Section Head:RSQuick:Date:5/5/86

INTERNATIONAL RESIDUE LIMIT STATUS

CHEMICAL: Fenvalerate (Pydrin®)

PETITION NO. 6E3391
R. W. Cook
4/22/86

[Pydrin®]

CCPR NO. _____

Codex Status

☒ No Codex Proposal Step 6 or above

Proposed U.S. Tolerances

40 CFR 180.379

Residue (if Step 9):

Residue: Fenvalerate

Crop(s)	Limit (mg/kg)

Crop(s)	Tol. (ppm)
Turnip Roots	0.5
Turnip Tops	20

CANADIAN LIMIT

Residue:

Crop	Limit (ppm)
none (on turnip roots or tops)	

MEXICAN TOLERANCIA

Residue:

Crop	Tolerancia (ppm)
none (on turnip roots or tops)	

Comments: