John Jordan

3/11/86

109301 FEB 4 1986
Shaughnessy No.

Date out of EFB: FEB 4

To: Gee
Product Manager # 17
Registration Division (TS-767)

From: E. Regelman, Head (acting)
Review Section 1
Environmental Fate Branch
Hazard Evaluation Division (TS-769c)

Attached please find the EFB review of..

Reg./File No.: 201-401

Chemical: Pydrin

Type Product: Insecticide

Product Name: Pydrin 2.4 E.C.

Company Name: Shell

Submission Purpose: Review data to support removal of rotational crop restriction

ZBB Code: other

ACTION CODE: 340

Date In: 11/16/82

EFB # 69

Date Completed: 4 FEB 1983

TAIS (level II) 64 Days 5

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

Ofs - Friday + ...

whole pkg. ! or Tues -

the synthetic pyrethroids ad. to glass diff. to do in water ! hyd. phot - H2O

(2) deficiencies

(1). ? - Hydl. (doesn't fulfill)

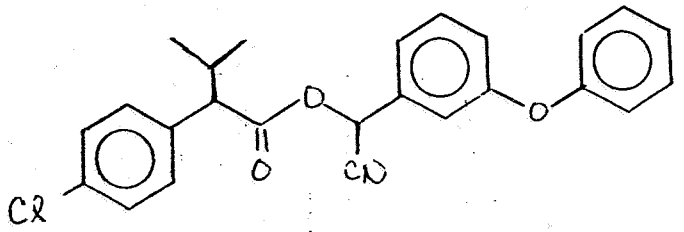
(2). ? - Phot. - H2O

(3). ? (CROP - Rotation ?)

1.0 INTRODUCTION

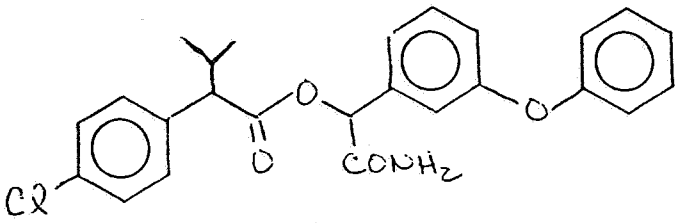
Shell Oil has submitted an application to delete the crop rotation restriction currently found on its label for Pydrin, 2.4 EC, an insecticide. Acc No 248812.

2.1 Pydrin: SD 43775



benzeneacetic acid, 4-chloro-alpha-(1methylethyl)-cyano(3-phenoxyphenyl)methyl ester

2.2 SD 47117



benzeneacetic acid, 4-chloro-alpha-(1-methylethyl)-(aminocarbonyl)(3-phenoxyphenyl)methyl ester

3.0 DISCUSSION

A confined rotational crop study as well as field rotation crop studies are reported. In the confined study, lettuce, table beets, and wheat were planted 30 and 120 days and 1 year after soil treatment. The results of the 1 year study were not reported. In the field studies, radishes, collards, and wheat were planted where cotton had previously been grown. These rotation crops were planted 400 days after the last of 38 applications of pydrin at 0.2 lb ai/acre to cotton and 30 and 120 days after 48 applications to cotton at the same rate. Soil samples in all studies were collected and analyzed.

3.1 A 30- and 120-Day Rotation Crop Study Using ^{14}C-SD 43775 Following a Single Soil Treatment at a Dosage Rate of 2 lb ai/ Acre. P.W. Lee, S.M. Stearns, and W.R. Powell, Tab 13.

Radiolabeled pydrin, both chlorophenyl- and phenoxyphenyl-labeled materials, were used. A total of 45 soil containers were prepared for the experiment. Hanford sandy loam soil (57.6% sand, 26.6% silt, 15.8% clay, 0.7% organic carbon, 9.3 meq/100 grams cation exchange capacity, and 6.1 soil pH) was packed into the containers. Each soil container was treated at a dosage rate of 2 lb ai/acre SD 43775. The application of 1/8 inch of water followed pesticide application. Cultivation of the soil took place 3-4 days after application. The soil was left to age under outdoor conditions for the appropriate number of days intervals before planting.

Soil core samples were collected at 3-4 days after application, 30-, 120-day and 1 year post application and at harvest of mature plant. Lettuce, beets, and wheat were grown at 30 and 120 days after application.

Soil samples were extracted with methanol and were quantified by LSC. The aqueous solution mixtures were extracted with chloroform and analyzed by two-dimensional TLC and LSC. Beets and straw samples were extracted using a hexane/isopropanol solvent mixture. Coextractions from concentrated hexane solvent extract were removed using 5% ethyl acetate in hexane. SD 43775 residues were determined by GLC. Reference standards for SD 43775 and possible metabolites are given in Table 3.

Results

The normal background level, limit of detection (Lm) and combustion efficiency are given in Table 4. Tables 6 and 7 present residue data in soil at the various sampling times. Table 8 gives the percent applied radioactivity in methanol extractable and non-extractable portions. All metabolites were less than 10% of original radioactivity.

The half life of applied ^{14}C-pydrin in sandy loam soil was calculated to be 60 days (Figure 3).

Table 5 summarizes the residues in various mature plant samples and in soil samples at planting time. The ^{14}C-residue levels in lettuce at all planting levels ranged from 0.01 - 0.03 ppm. For beet leaves the residues ranged from 0.10 - 0.18 ppm for the 30 day sample but 0.02 ppm for the 120 day sample. In beet roots for the 30 day sample 0.27 - 0.31 ppm were found and residues ranging from 0.03 - 0.04 ppm were found at 120 days. Wheat straw showed levels ranging from 0.29 - 0.33 ppm at 30 days but from 0.04 - 0.05 ppm at 120 days. Wheat hulls and grain highest residue levels were at 30 days (0.08 ppm and 0.04 ppm, respectively). At 120 days, wheat hulls and grain showed levels below limit of detection. Further analysis of beet roots and wheat straw indicated no detectable SD 43775.

Conclusions

It appears that the confined rotational crop study indicates that residues of pydrin and its metabolites are at levels near or below limits of detection at 30 and 120 day planting intervals after an original single application of pydrin at a rate equivalent to 2 lb ai/acre.

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3.2.1 1982 - Residue Data for SD 43775 in Radishes Following 38 or 48 Applications of SD 43775 to Cotton, A California Study, Tab 1.

Pydrin was applied at a rate of 0.2 lb ai/acre to cotton. The applications numbered 8 in 1977, 10 in 1978, and in 1979 and in 1980, and in 1981. Mature radish roots and tops were sampled on 78, 206 and 447days. SD 43775 was extracted in presence of hexane/IPA and analyzed for pydrin content using GC/EC. Results are given in the Table A. One sample of radish tops (0.02 ppm) and one sample of radish roots (0.01 ppm) showed any residues.

3.3.2 1982 - Residue Data for SD 47117. A Possible Soil Metabolite of SD 43775 in Radishes Following 38 or 48 Applications of SD 43775 to Cotton, A California Study. Tab 2.

This is the same as 3.2.1 except that SD 47117 was analyzed for. Extraction was accomplished with hexane/isopropanol (3:1) and analyzed using HPLC-UV techniques. Results are given in the Table B. Analyses indicate residues are present below limits of detection.

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3.2.3 1982 - Residue Data for SD 43775 in Soil From Radishes Following 38 or 48 Applications of SD 43775 to Cotton. A California Study. Tab 7.

Soil was sampled at 30, 120, and 400 days after last pydrin application at 0.2 lb ai/acre at radish planting. Soil was also sampled at harvest at 78, 206, and 447 days after last application. Ten cores per plot were taken and soil samples submitted represented 0-3", 3-6", and 6-12" depths. Soil samples were frozen until analyzed by GLC/EC techniques. The highest residue foind was 0.16 ppm in a sample 30 days after final treatment at planting time. At harvest, residues ranged from below limit of detection to 0.07 ppm. See Table C for complete results.

Soil residue 0.16

3.2.4 1982 - Residue Data for SD 47117, A Possible Soil Metabolite of SD 43775 in Soil from Radishes Following 38 or 48 Applications of SD 43775 to Cotton, A California Study. Tab 8.

This is similar to 3.2.3. Extraction was accomplished using acetone/hexane (1:1). Analysis was by HPLC equipped with a UV detector. Results indicate levels of SD 47117 were below limits of detection in all cases. See Table D.

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3.3.1 1982 - Residue Data for SD 43775 in Collards Following 38 or 48 Applications of SD 43775 to Cotton, A California Study. Tab 3.

SD 43775 was applied at a rate of 0.2 lb/acre to cotton eight times in 1977, 10 times in 1978, 1979, 1980 and 1981. Collards were planted 30 and 120 days days following the last application. Sampling of mature plants occurred 158, 228, and 527 days after last treatment. Extraction was accomplished using hexane/IPA and analysis was done by GC/EC techniques. No samples showed levels above limit of detection. See Table E.

3.3.2 1982 - Residue Data for SD 47117, A Possible Soil Metabolite of SD 43775, in Collards Following 38 or 48 Applications of SD 43775 to Cotton, A California Study. Tab 4.

This is the same study as in 3.3.1 except that SD 47117 was looked for. Extraction of samples was accomplished using hexane/isopropanol (3:1). Quantitation occurred using HPLC equipped with a UV detector. No detectable residues were found (Table F).

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3.3.3 1982 - Residue Data for SD 43775 in Soil from Collards Following 38 or 48 Applications of SD 43775 to Cotton, A California Study. Tab 9.

Soil was sampled after last treatment at 30, 120, and 400 days at collard planting and 158, 228, and 527 days at collard harvest. Ten soil cores per plot were removed with soil samples of 0-3", 3-6", and 6-12" depths. Analysis was by GLC/EC techniques. At planting, the range of residues found was <0.01 - 0.09 ppm. At harvest, the range of residues found was <0.01 to 0.03 ppm. See Table G.

3.3.4 1982 - Residue Data for SD 47117, A Possible Soil Metabolite in Soil, from Collards Following 38 or 48 Applications of SD 43775 to Cotton, A California Study. Tab 10.

This is similar to 3.3.3. Extraction was accomplished using acetone/hexane (1:1). Analysis was by HPLC equipped with a UV detector. The results indicate no detectable residues were found (Table H).

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3.4.1 1982 - Residue Data for SD 43775 in Wheat Following 38 or 48 Applications of SD 43775 to Cotton, A California Study. Tab 5.

SD 43775 was applied at a rate of 0.2 lb/acre to cotton 8 times in 1977, 10 times in 1978, 1979, 1980 and 1981. Wheat was planted 30 and 120 days following last application. Sampling of mature plants occurred 247, 261, and 614 days after last treatment. Extraction was accomplished using hexane/IPA and analysis was by GC/EC methodology. No residues above limit of detection were found in heads or straw. See Table I.

3.4.2 1982 - Residue Data for SD 47117, A Possible Soil Metabolite of SD 43775, in Wheat Following 38 or 48 Applications of SD 43775 to Cotton, A California Study. Tab 6.

This is the same study as in 3.4.1 except that SD 47117 was looked for. Extraction of samples was accomplished by using hexane/isopropanol (3:1). Quantitative analysis was done using HPLC with a UV detector. No detectable residue levels were found. See Table J.

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3.4.3 1982 - Residue Data for SD 43775 in Soil from Wheat Following 38 or 48 Applications of SD 43775 to Cotton, A California Study. Tab 11.

Soil was sampled at 30, 120, and 400 days at wheat planting and 247, 261, and 614 days at wheat harvest after last treatment. Ten cores per plot were removed with soil samples of 0-3", 3-6", 6-12" in depth. Analysis was by GLC/EC techniques. At planting, samples showed residue levels ranging from <0.01 - 0.16 ppm. At harvest, samples showed levels ranging from <0.01 - 0.06 ppm. See Table K.

3.4.4 1982 - Residue Data for SD 47117, A Possible Soil Metabolite of SD 43775 in Soil, from Wheat Following 38 or 48 Applications of SD 43775 to Cotton, A California Study. Tab 12.

This is similar to 3.4.3. Extraction was accomplished using acetone/hexane (1:1). Analysis was by HPLC equipped with a UV detector. The results indicate no detectable residues were found. See Table L.

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4.0 CONCLUSIONS AND RECOMMENDATIONS

Table M summarizes the results of the residues found in rotational crops after 4 or 5 seasons of pydrin applications according to label rates. Only one sample of radish tops and one sample of radish roots showed any residue levels of SD 43775. No sample showed any detectable levels of SD 47117 in either plant or soil.

These data suggest that rotational crop restrictions can be removed for grain and leafy vegetables but should remain for root crops. EFB suggests that the root crop cold study be repeated using table beets so that a comparison can be made with the hot study which used beets. After review of such data, EFB would reconsider removal of the root crop restriction, as well

Richard V. Moraski, Ph.D
Chemist, Review Section No. 1
Environmental Fate Branch

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