Shaughnessy No.: 101201

Date Out EAB: 3/18/86

Signature: _____

TO: William Miller
Product Manager # 16
Registration Division TS-767C

FROM: Emil Regelman, Chief
Review Section #3
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

Attached please find the EAB review of...

Reg./File No.: 239-2452 &3125-341

Chemical Name: Methamidophos

Type Product: Insecticide - Acaricide

Product Name: MONITOR

Company Name: CHEVRON Chemical Company

Purpose : 1) Review of volatility and confined crops accumulation data; 2) Request for advice re field studies on same.

ACTION CODE(s): 660

EAB # (s): 6137 & 6138

Date Received: 11/1/85

TAIS Code: 44

Date Completed: 03/18/86

Total Reviewing Time: 1.5 Day

Monitoring requested: _____

Monitoring voluntarily Done: _____

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

DATA NO.: 11/1/85

Confidential Business Information
Does Not Contain National Security Info. E.O. 12065

12372

(RD PROVIDE)
SHAUGNESSY NO.
101201-2

CHEMICAL NAME: methamidophos

Identifying Number	Action Code	Reference Number	Record Number	Study Guideline or Narrative Description	Reg. Std. Review Submission Criteria (SEE BELOW)	Accession Number	(RSERB Provide) MRID Number	(HED/BUD/TSS Complete) Review Results: Acceptable (A)/ Unacceptable(U)
239-2452	660	4	161563	Lab Volatility	3	259942		
125-341	660	2	161564	Confined rotational crop	3	"		

PRODUCT MANAGER (PM) or REVIEW MANAGER (RM) AND NUMBER: W. Miller (16)

PM/RM TEAM MEMBER AND NUMBER: M. MAUTZ (3)

DATE RECEIVED (EPA): 10/1/85

RD BRANCH CHIEF INITIALS: 11/1

CHECK APPLICABLE BOX:

- ☐ Adverse 6(a)(2) Data (405,406)
- ☐ Suspect Data (415,416)
- ☐ IBT Data (485,486)
- ☐ Groundwater Data (495,496)
- ☐ Data Waiver Request (Reregistration) (650,651)
- ☐ Formulation Data and Labeling (Reregistration) (655,656)
- ☒ Generic Data (Reregistration) (660,661)
- ☐ Special Review Data (870,871)

AH

NUMBER OF INDIVIDUAL STUDIES SUBMITTED: 2

RELATED ACTIONS: Refer to attached note

INSTRUCTIONS: Review is needed to determine whether field volatility and field rotational crop studies are to be required under the methamidophos Standard. Copy of data table attached

TO BE COMPLETED BY RSERB

DATE SENT TO HED/BUD/TSS: 11-04-85

PRIORITY NUMBER: 50

PROJECTED RETURN DATE: 01-03-86

DATE RETURNED TO RD (HED/BUD/TSS PROVIDE):

REVIEWS SENT TO:

HED: ☐ SIS ☐ TB ☐ RCB ☒ EAB ☐ EEB RD: ☐ TSS BUD: ☐ EAB ☐ SSB

	TO:	TYPE OF REVIEW	NUMBER OF ACTIONS: Reregistration	Special Review	Other
HED		Toxicology			
HED		Ecological Effects			
HED		Residue Chemistry			
HED	☒	Exposure Assessment	2		
RD/TSS		Product Chemistry			
RD/TSS		Efficacy			
RD/TSS		Precautionary Labeling/Acute Tox.			
BUD		Science Support			
BUD		Economic Analysis			

FOR DATA SUBMITTED UNDER A REGISTRATION STANDARD: Review Submission Criteria

Policy Note #31

1 = data which meet 6(a)(2) or meet 3(c)(2)(B) flagging criteria

2 = data of particular concern

3 = data necessary to determine tiered testing requirements

NOTE TO TSS: Return 1 Copy To RSERB

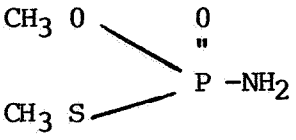
INCLUDE AN ORIGINAL AND FOUR (4) COPIES OF THIS COMPLETED FORM FOR EACH BRANCH ASSIGNED FOR REVIEW.

1. CHEMICAL: Common Name: Methamidophos

Trade Name: MONITOR

Chemical Name: 0, S-Dimethyl phosphoramidothioate

STRUCTURE:



DRAFT

Formulations: 4# EC and 6# EC

2. TEST MATERIAL:

2.1 Lab. Volatility; ^{14}C-methamidophos in H_2O sprayed onto soil @ 1 lb. a.i./A.

2.2 Confined rotational crops: MONITOR 4 @ 60, 120, 240, and 480 oz. a.i./A. (max. seasonal rate is 120 oz./A.)

2.3 Confined rotational crops: ^{14}C-MONITOR in propylene glycol and water as a foliar spray.

3. STUDY ACTION/TYPE:

3.1 Laboratory volatility and confined accumulation/rotational crop (grain, legume, root crop) studies made to fulfill EPA guidelines requirements.

4. STUDY IDENTIFICATION:

4.1 Peck, D.E. Lack of methamidophos volatility from soil - laboratory study. Chevron Chemical Co. File No. 721.2/MONITOR. May 9, 1984. (Unpublished). Accession NO. 259942, Ref. 7.

4.2 Murphy J.J., and R.A. Morris. Residues of MONITOR in rotational crops. Mobay Chemical Corp. Aug. 3, 1979. (Unpublished). Accession No. 259942, Ref. 8.

4.3 Strankowski, K.J. et. al. [^{14}C] MONITOR® rotational crop study. Mobay Chemical Corp, Aug, 11, 1981. (unpublished). Accession No. 259942, Ref. 9.

5. REVIEWED BY:

Hudson L. Boyd
Chemist
EAB/HED/OPP

Signature: Hudson L Boyd

Date: 3-25-86

6. APPROVED BY:

DRAFT

Emil Regelman, Supervisory Chemist
Review Section #3
EAB/HED/OPP

Signature:_____

Date:_____

7. CONCLUSION:

7.1 Methamidophos applied at maximum recommended rates will not volatilize from the soil in distinquishable amounts.

7.2 Methamidophos applied to soil at maximum recommended rates would not be expected to be detected in grain, pod vegetable, or root crops planted 30 or more days after the application.

8. RECOMMENDATION:

8.1 Field volatility studies per Sec. 163-3 will not be required.

8.2 Field accumlation studies with rotational crops per Sec. 165-2 will not be required.

9. BACKGROUND:

Registrant submitted test data to satisfy requirements of Sec. 163-2 and 165-1 and inquired whether or not full blown field studies will be required.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

Both studies were well planned and conducted in such a manner to provide meaningful data from which conclusions were possible.

10.1 Peck, D.E. Lack of methamidophos volatility from soil - Laboratory study. Chevron Chemical Co. File No 721.2/MONITOR. May 9, 1984. (Unpublished.) Accession No. 259942 Ref. 7.

a. Testmaterials and methods

^{14}C methamidophos of > 99% radiochemical purity and with a specific activity of 1.016×10^5 dpm/ug, formulated as MONITOR 4 spray (40% methamidohos [redacted] was mixed with water and sprayed onto the surface of a sandy soil (Ocoee, FL) at the rate of 1 lb. a.i./A. Moist air was passed over the soil at 100 ml/min and 25°C and any volatile ^{14}C-methamidophos was collected in a methanol scrubber. Methanol scrubbers were changed at 4, 8, and 24 hrs and every 24 hrs thereafter for 14 days. Contents of the scrubbers were evaporated to dryness and the residues were first taken up in methanol and spotted on a TLC plate. Plates were examined both visually (chromatograms) and by radiography.

DRAFT

b. Reported results

Except for one 5-day sample, no ^{14}C-methamidophos was ~~deleted~~ detected on any chromatogram (duplicate showed nothing).

c. Study author's conclusions

The concentration of methamidophos in the air was < 0.007ug/m^3, and the rate of loss from the soil was < 1 x 10^{-6} ug/cm^2/hr (< 1 x 10^{-5}% of the dose /hr.).

d. Reviewer's evaluation of study/results

The study was planned and executed in a manner to provide defendable conclusions. These studies fulfill the EPA Guideline requirements for laboratory volatility studies (163-2) and field volatility studies (163-3) will not be required.

10.2 Murphy J.J., and R.A. Morris. Residues of MONITOR in rotational crops. Mobay Chemical Corp. Aug. 3, 1979. (Unpublished). Accession No. 259942, Ref. 8.

a. Test materials and methods

Field plots were established on silty clay loam (KS) and sand (FL) soils. Plots were cultivated and the surfaces were sprayed as uniformly as possible with MONITOR 4 at rates of 60, 120, 240, and 480 oz. a.i./A. (the maximum seasonal use rate of MONITOR would be approximately 120 oz. a.i./A). Plots were left undisturbed until planting of rotational crops. Soil core samples were taken 30, 120, and 364 days post-treatment.

At 30, 60, 90, 120, or 365 days after treatment plots were cultivated to a 5" depth. In Kansas, sorghum, wheat, snapbeans, peas, carrots, and radishes were planted; in Florida the crops were corn, black-eyed peas, and turnips.

Samples of green forage, grains, and green vines from pod vegetables were taken during the growing season. All crops were harvested at maturity. Crop samples were analyzed by the methods of either Leary or Mc Namara and Stanley (GC methods not further described). Soil samples were analyzed by the method of Morris (not described).

b. Reported results

Residues in the sand samples were less than 0.03 ppm (same as control) at every sampling interval and every treatment rate. Only at the 32 day sampling interval were residues found in the silty clay loam and they ranged from 0.04 to 0.7 ppm. Thereafter, residues were no more than 0.03 ppm.

Grain Crops

In general (except for apparent abberrations in the 365-day corn green forage) residues were either not detectable or <0.03 ppm.

Root crops

Carrot crops failed. Such crops of radish and turnips that grew contained <0.03 ppm residues in both tops and roots at each sampling interval.

In KS, radishes planted 30, 60, and 90 days failed. In FL, turnips planted 30, and 60 days washed out except for the 30 day crop on 120 oz. a.i./A plot. No residues were found in turnips.

Pod vegetables

In both the vines and bean (pea) residues were <0.03 ppm ai., all sampling intervals and all treatment rates.

c. Study authors conclusions

"The results suggest that MONITOR residues would not occur in mature pod vegetables, grain or root crops planted 30 days or more after applying MONITOR at 60 to 480 a.i./A".

d. Reviewer's evaluation of study/results

The study was well planned and executed. It was unfortunate that climatic factors interfered with the total objective.

MONITOR applied at recommended rates and practices is unlikely to accumulate in rotated crops.

10.3 Strankowski, K. J. et.al. [^{14}C] MONITOR® rotational crop study. Mobay Chemical Corp. Aug. 11, 1981. (Unpublished). Accession No. 259942, Ref. 9.

a. Test materials and methods

Kale grown in bathtubs containing loamy sand was sprayed with [^{14}C] MONITOR (foliar spray) weekly for a total of 8 weeks, beginning at 5 weeks postplanting. Each treatment was equivalent to 16 oz. a.i./A (field specifications), consisting of 96 mg or 1.46 m Ci [^{14}C] MONITOR [redacted]

Rotational crops (oats or wheat, sugar beets, and kale) were planted 30, 120, and 365 days following the final MONITOR application. Crops were sampled four times through their growth and at maturity. Soil samples were taken at planting and each time crops were sampled.

Crops and soil were radioassayed by combusting an aliquot of each sample to $^{14}CO_2$, collecting the liberated $^{14}CO_2$ and counting the trapped $^{14}CO_2$ in a liquid scintillation spectrometer.

Samples of mature crops from the 30-day rotation and soil samples taken at harvest of the 30-, 120-, and 365-day crops were also analyzed for their MONITOR content by a modified version of the extraction method of McNamara and Stanley (referenced but not described; apparently modified to radioassay the organosoluble fraction).

d. Reported results

Radioactive residues were expressed as ppm MONITOR equivalents at a sensitivity of 0.004 ppm. Residues in soil decreased with time from planting crop to maturity but whether in the 30-day or 365-day plots they were similar at maturity, about 0.180 ppm.

Concentrations in mature wheat heads ranged from 0.103 ppm in plants planted 30 days post-treatment to 0.016 ppm in those planted 120 or 365 days post-treatment. Oat heads contained only 0.010 ppm ^{14}C-MONITOR residues when plants were grown in soil treated with MONITOR 30 days prior to planting. Mature wheat stalks contained residue levels ranging from 0.041 ppm in plants grown in the 30-day soil to 0.016 ppm in plants grown in soils treated 120 or 365 days preplanting. Concentrations were three or more times higher in wheat forage than in the fresh straw. Concentrations in oat straw and forage were somewhat less than in the wheat constituents.

Residues in mature beet tops and bulbs ranged from 0.016 and 0.041 ppm in the 30-day interval plants to 0.013 and 0.07 ppm in the 120-day plants and to 0.009 and 0.007 ppm in the 365-day interval plants. At the first sampling of crop (unclear time interval from planting) beet tops grown in soils treated 30 days prior to planting contained 0.075 ppm MONITOR equivalent residues. Bulbs were not sampled at that stage.

Concentrations in mature kale range from 0.038 to 0.006 ppm in plants grown in soil treated 30 or 120 days prior to planting.

c. Study author's conclusions

Total radioactive residues decreased during the maturation of rotational crops planted 30, 120, and 365 days after the last of 8 [^{14}C] MONITOR applications to kale, and soil residues decreased three fold during the period covered by the growing of the three sets of rotational crops. Because previous research had shown that minor amounts of radio labeled amino acids and carbohydrates arise from the breakdown of ^{14}C MONITOR in soils

(i.e., [methylthio-^{14}C] MONITOR it appears that at least some of the ^{14}C detected in the crops was probably due to uptake of natural soil constituents - either incorporated radioactive breakdown products of [^{14}C] MONITOR or from the ^{14}C liberated during the decomposition of the MONITOR. Probably <0.04 ppm of the residue in soil was MONITOR.

d. Reviewer's conclusions

1. Measuring the radioactive carbon residues rather than MONITOR per se left the researcher's conclusions open to question. However, reference was made to the studies for the registration standard and it was shown that methamidophos has a short (2-6 day) half-life in silt, loam, and sandy soils and that [S-methyl-^{14}C] methamidophos metabolized to radiolabeled amino acids and carbohydrates within 64 hours in a silt loam at 21° or 37°C. Consequently, when this study is considered along with that by Murphy and Morris (1979) it appears that MONITOR will not be taken up by a rotated crop planted 30 or more days after the last application.

   Together these studies fulfilled the EPA Guideline requirements for studies of confined accumulation in rotational crops (165-1) and field accumulation studies (165-2) will not be required.

11. COMPLETION OF ONE-LINER:

10.1 The current one-liner was updated

12. CRI APPENDIX:

This information should be treated as CBI. Copies of studies are appended.

DRAFT