

US EPA ARCHIVE DOCUMENT

125401

Date Out EFB:

DEC 10 1985

To: R. Taylor
Product Manager 25
Registration Division (TS-767)

From: Samuel M. Creeger, Chief *SMC*
Review Section No. 1
Exposure Assessment Branch
Hazard Evaluation Division (TS-769)

Attached please find the environmental fate review of:

Reg./File No.: 279-GNLE, -GNLG and -GNLU

Chemical: FMC 57020

Type Product: Herbicide

Product Name: COMMAND Herbicide

Company Name: FMC

Submission Purpose: Response to previous review to support use on
soybeans

Date In: 9/26/85

Action Code: 106

Date Completed: DEC 10 1985

EAB # 5966-5968

TAIS (level II)

Days

0.5

Deferrals To:

Ecological Effects Branch

Residue Chemistry Branch

Toxicology Branch

Monitoring study requested by EAB:

Monitoring study voluntarily conducted by registrant:

1. INTRODUCTION

In the previous review of FMC 57020 dated August 27, 1985, several questions were asked regarding the aqueous and soil photolysis studies. Also, in the July 2, 1985 review, a detailed modeling assessment referenced in an earlier letter was requested. All data requirements will be satisfied when the above issues are satisfactorily addressed.

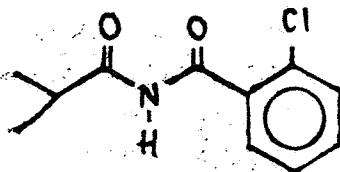
2. DISCUSSION

The specific questions are:

- (1) Does the glassware (ampoules, flasks and glass tops) used in the tests transmit sunlight without any absorption?
- (2) What is the fate of the isoxasolidine ring of FMC 57020 molecule? What data is used to support the degradation pathway of the isoxasolidine ring proposed in Fig. 6 (pg. 19 of the August 27, 1985 review)?
- (3) Provide the structure of "arylamide", one of the claimed phototransformation products.
- (4) Submit the detailed modeling assessment referenced in the EEC analysis attached to the March 19, 1985 FMC letter.

The registrant has adequately responded to the above issues as follows:

- (1) The quartz and borosilicate (Pyrex) glassware used adequately transmitted the incident light. See the attached transmission spectra.
- (2) The proposed photodegradation pattern of the isoxasolidine moiety of FMC 57020 is reasonable. See the attached information.
- (3) The FMC report misspelled "arylamide". The correct spelling is "arylimide" and its structure is:

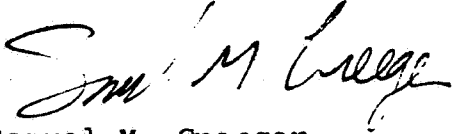


- (4) Carolyn K. Offutt, Chief of the Modeling and Guidelines Section in EAB, has stated that no further modeling information is needed.

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3. CONCLUSIONS/RECOMMENDATIONS

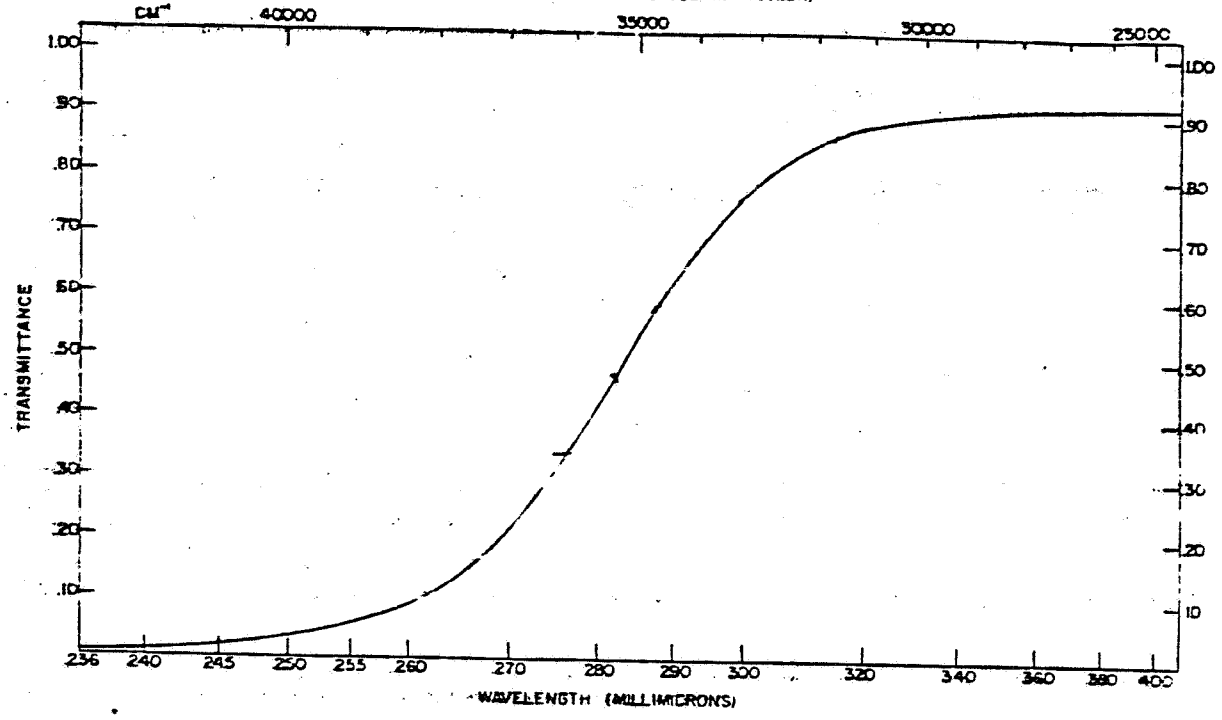
All environmental fate data requirements have been satisfactorily fulfilled in support of the use of FMC 57020 (herbicide) on soybeans.



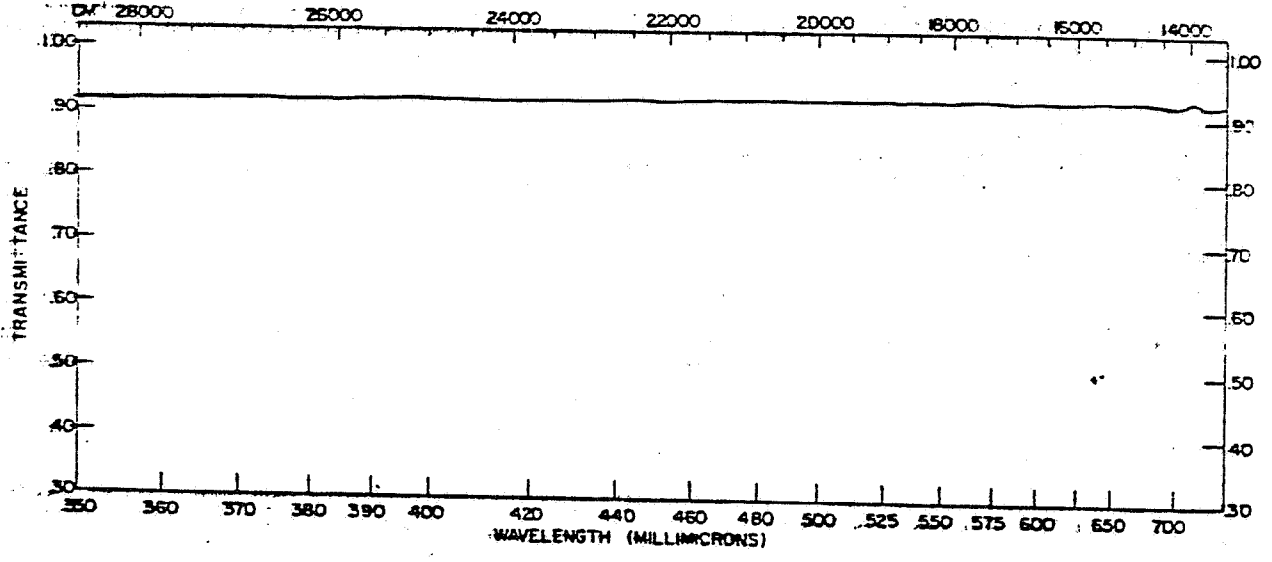
Samuel M. Creeger
December 11, 1985
Section #1/EAB
Hazard Evaluation Division

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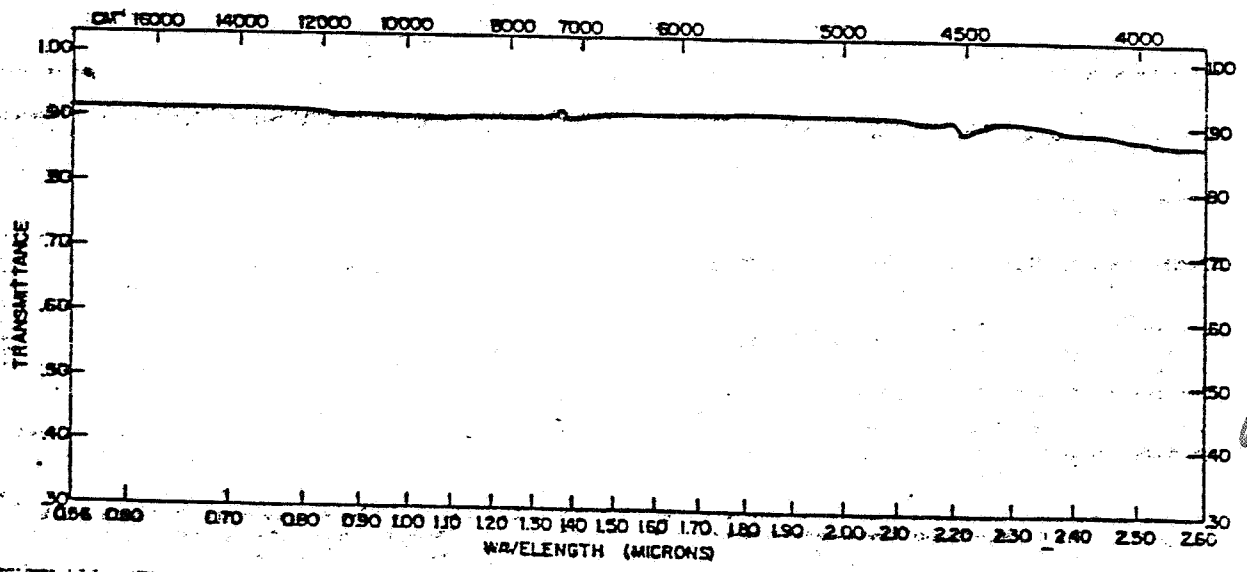
UV TRANSMISSION (CODE 7740-1.007mm THICK)



VISIBLE TRANSMISSION (CODE 7740-1.007mm THICK)



INFRARED TRANSMISSION (CODE 7740-1.007mm THICK)



ATTACHMENT I
UV/INFRARED TRANSMISSION FOR BOROSILICATE GLASS 1/

1/ CORNING GLASS WORKS, CORNING, NY 14380. CODE NO. 7740

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PHOTODEGRADATION - WATER

1. Does the glassware transmit sunlight without absorbing the light?

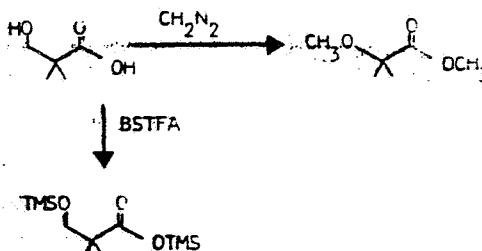
This issue was addressed in Report No. P-1135, p.5. All glassware used in these studies (both indoor & outdoor tests), except Test No. 5 in Table 1 in which quartz flasks were used, were all borosilicate (i.e., Pyrex) glass which allows transmission of light wavelength greater than 290 nm. As stated in Material Information provided by Corning Glass Works, this glass showed uv cutoff at <240 nm. In visible and infrared range, no absorption of incident light was observed (Attachment 1).

2. What is the fate of the isoxazolidine ring when exposed to sunlight?

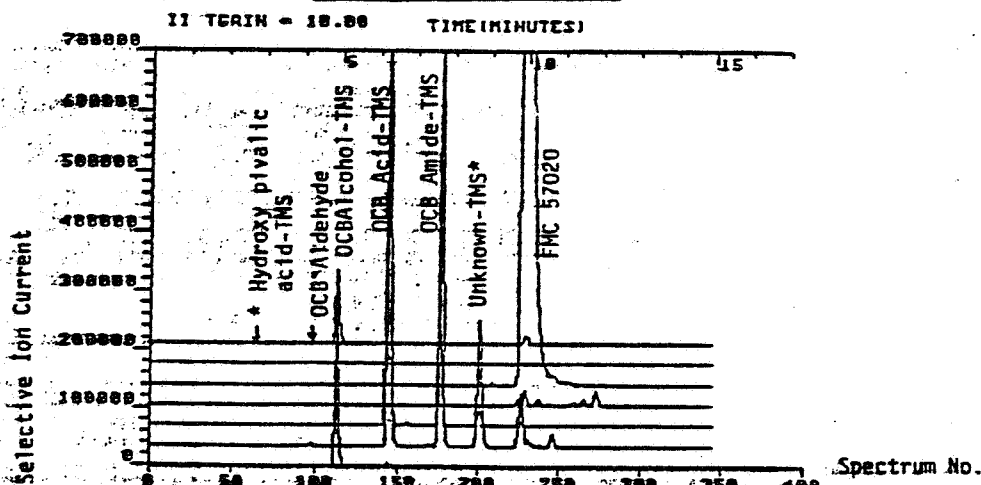
In a prior report (P-0869) submitted to EPA, FMC provided a detailed explanation on structure elucidation of all isolated photodegradation products, including the heterocyclic degradates isoxazolidinone, hydroxy pivalic acid, and arylimide. The products were identified thru various derivatization techniques (TMS and CH_2N_2) and GC/MS analysis.

Some brief summaries of structure elucidation work (as in Report No. P-0869) are outlined in the following:

Hydroxy Pivalic Acid

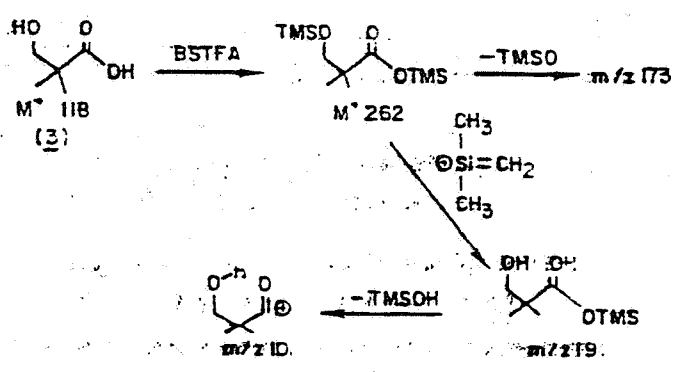
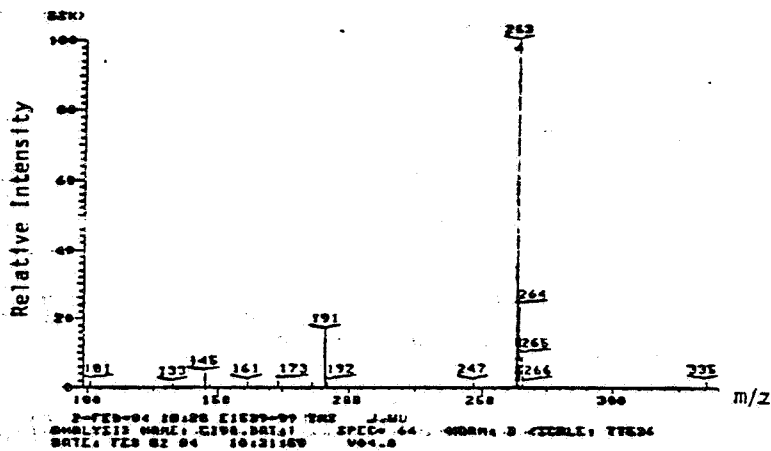


Chemical Ionization



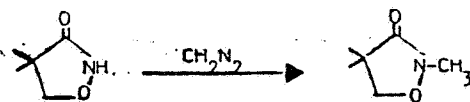
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CI MASS SPECTRUM OF BIS-TMS DERIVATIVE OF
HYDROXYPIVALIC ACID



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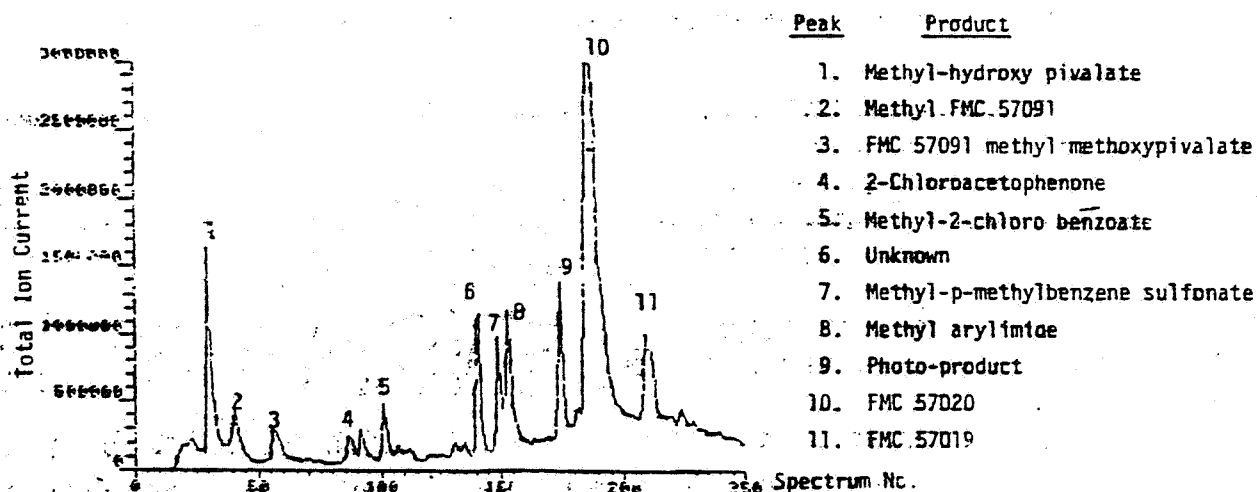
Isoxazolidinone



FMC 57091

FIGURE 19

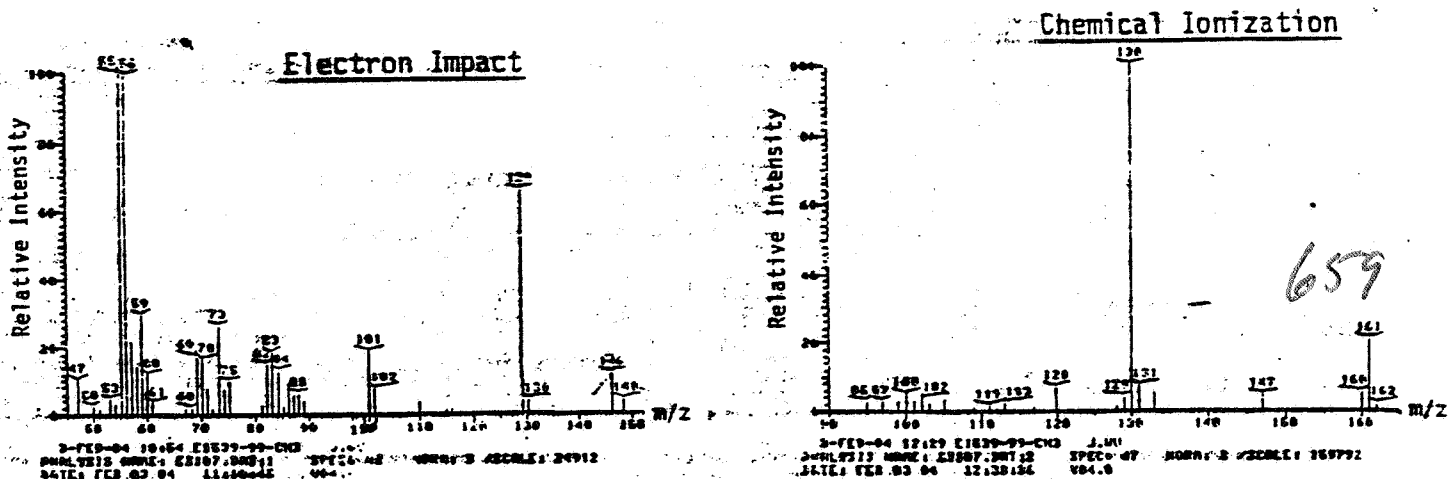
EI/MS TOTAL ION CHROMATOGRAM OF ETHYL ACETATE FRACTION TREATED WITH DIAZOMETHANE



3-FEB-04 16:54 E1839-99-CH3 J.M.U.
ANALYSIS NAME: E1807.DAT 1 DATE: FEB 03 04 12:25:48 V04.0

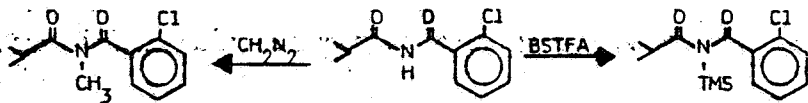
FIGURE 20

EI/CI MASS SPECTRA OF THE METHYLATED DERIVATIVE OF FMC 57091



3-FEB-04 10:54 E1839-99-CH3 J.M.U. ANALYSIS NAME: E1807.DAT 1 DATE: FEB 03 04 11:50:42
3-FEB-04 12:19 E1839-99-CH3 J.M.U. ANALYSIS NAME: E1807.DAT 2 DATE: FEB 03 04 12:38:54

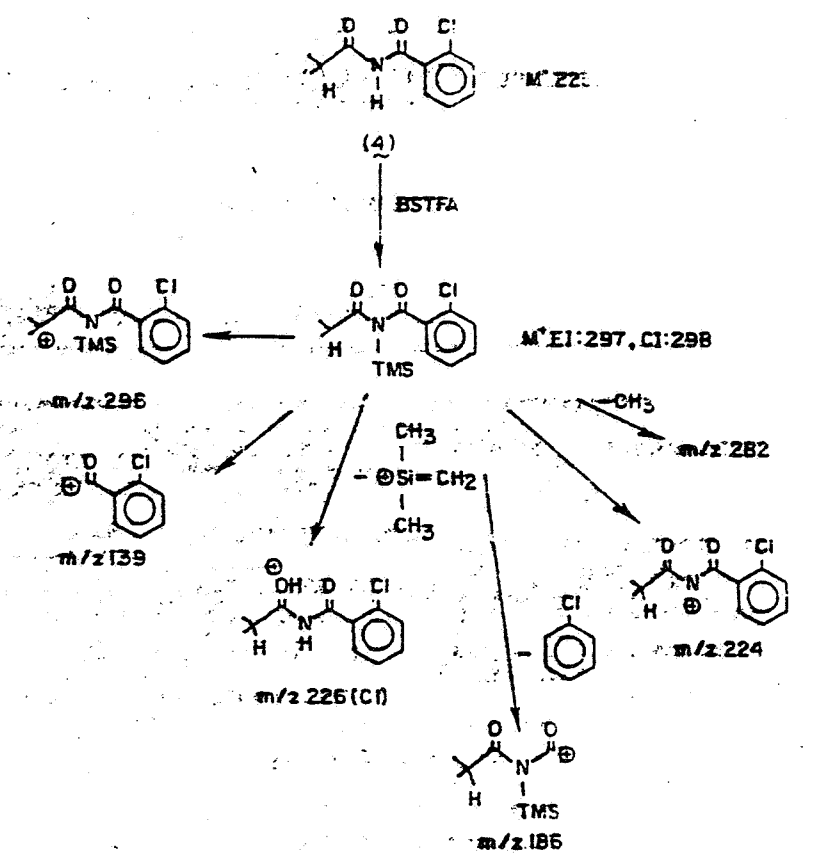
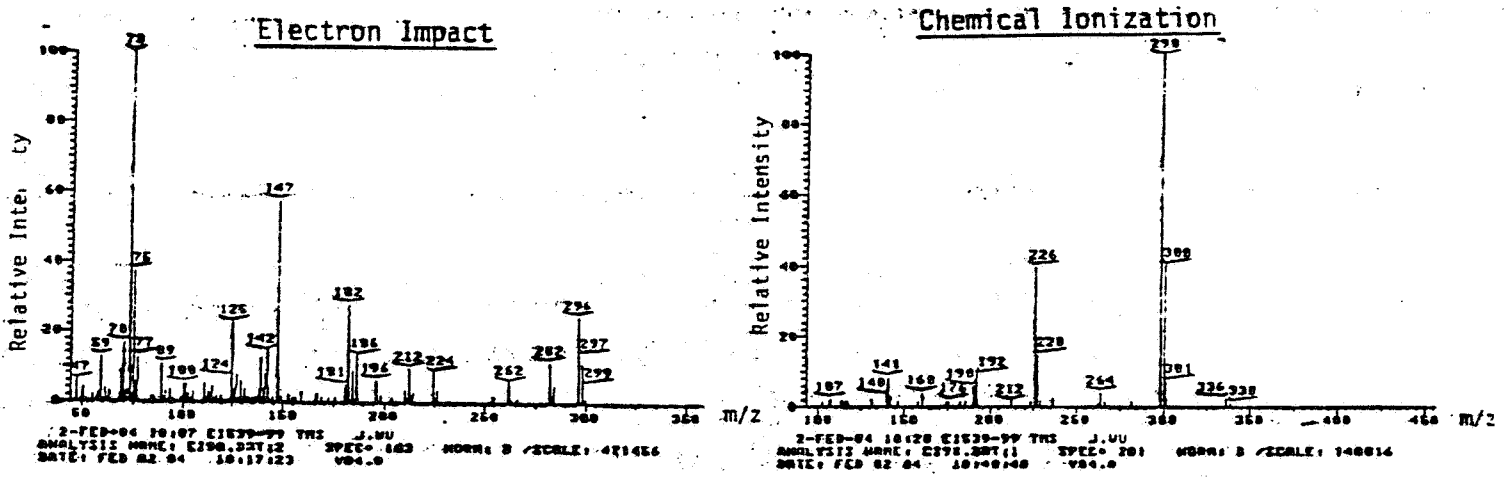
Arylimide



Arylimide

FIGURE 18

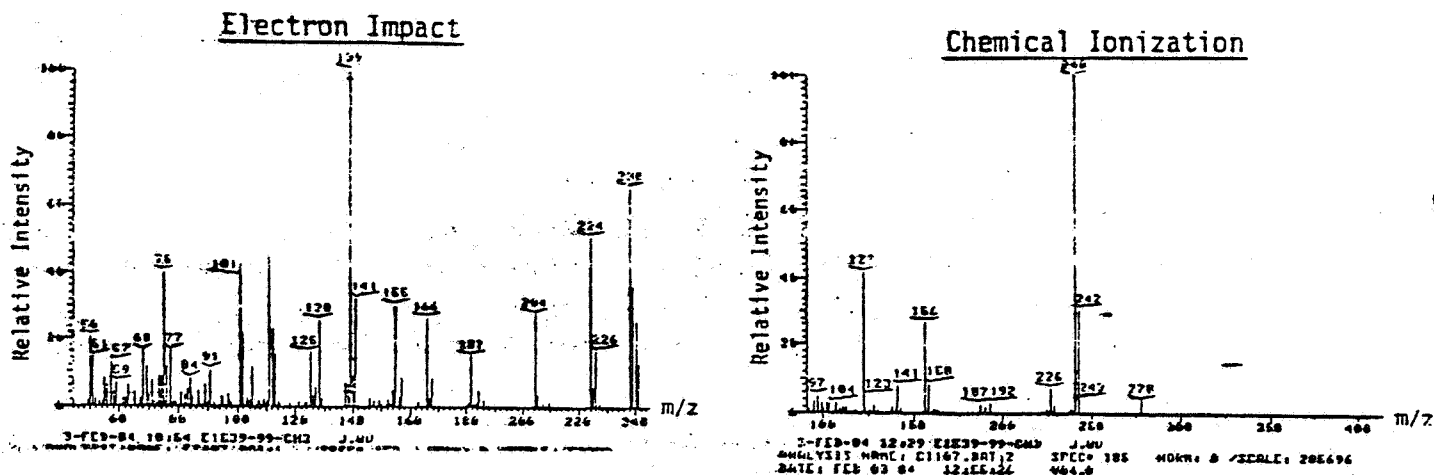
EI/CI MASS SPECTRA OF TMS DERIVATIVE OF IMIDE PHOTODEGRADATE



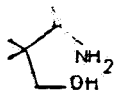
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FIGURE 2:

EI/CI MASS SPECTRA OF METHYLATED ARYLIMIDE PHOTODEGRADATE



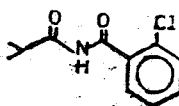
The degradation pathway was proposed in a prior submitted report (P-0869, p. 30) except the volatile degradate, i.e., CO₂ which was identified in this report, therefore, it was added to this degradation pathway (Attachment 2). Also, hydroxy pivalamide was not isolated and identified per se but proposed as a logical intermediate from isoxazolidinone to hydroxy pivalic acid.



Hydroxy Pivalamide

PHOTODEGRADATION - SOIL

Structure of arylimide -



Complete structure elucidation of arylimide was reported in FMC Report No. P-0869 (also see page 4).

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