100601

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Shaughnessey No. 100601

Date Out EFB: 15 NOV 1984

To: H.Jacoby
Product Manager 21
Registration Division (TS-767)

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

Attached please find the environmental fate review of:

Reg./File No: 3125-283, -236 and -237

Chemical: Fenamiphos

Type Product: Nematocide

Product Name: NEMACUR

Company Name: Mobay

Submission Purpose: Response to data gaps - photolysis

ZBB Code: _____ ACTION CODE: 336

Date in: 9/5/84 EFB # 4561-4563

Date completed: 11/15/84 Tais (level II) Days

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Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

3 pages w/ 1 page confidential Attachment

1.0 INTRODUCTION

Mobay has submitted a reply to the issue raised in our 2/28/84 review of fenamiphos soil and aqueous photolysis studies.

2.0 DISCUSSION

In our previous review (2/28/84) we concluded that since the artificial light source used did not simulate natural sunlight, we could not determine if other photoproducts would be formed if the full spectrum of wavelengths for sunlight were used for irradiation. We also concluded that if the company could show from the previous photolysis study (evaluated in EAB review of 12/16/76) that other degradates are not formed when fenamiphos is irradiated with the full spectrum of wavelengths in soil and water, then we could conclude that the photolysis data requirement had been met.

The registrant has given the following reply:

"The previous study (Report No. 39217) indeed supports the new study (Report No. 86171). In both studies the degradation of NEMACUR clearly proceeded through the sulfoxide followed by further oxidation of the sulfoxide molecule. In the earlier study oxidation of the sulfoxide continued to NEMACUR sulfone and probably other, unidentified, polar products. In the later study oxidation proceeded beyond the sulfone to the sulfonic acid. In both studies hydrolysis to phenolic analogs occurred. Thus, the photodegradation of NEMACUR in both studies proceeded in the same manner - oxidation to the sulfoxide and beyond - independent of the nature of the light source employed. Fewer products were identified in the earlier study, but it is likely that the polar TLC origin material described therein contained the more polar degradation products (sulfonic acids) identified in the later study."

Concerning the less than full spectrum of the artifical light source:

"We believe there is no reason for concern since those environmentally important wavelengths of light which NEMACUR can adsorb were available in the artificial light source. Included in Attachment 1 [See attached] is the UV-visible light absorption spectrum of NEMACUR in aqueous solution. It indicates that NEMACUR does not absorb light above a wavelength of 312 nm. The EPA guidelines (Pesticide Assessment Guidelines, Subdivision N Chemistry: Environmental Fate) of October 18, 1982, indicate on page 48 that samples should be exposed to natural or simulated sunlight conditions including those wavelengths greater than 290 nm....Thus, for NEMACUR the only wavelengths of light that are applicable in this situation are those between 290 and 312 nm. Attachment 2 shows the emission spectrum for natural sunlight in May, July and December which indicates that little, if any, light energy below 300 nm is available at the earth's surface. Hence, strictly

speaking, the envelope of light wavelengths pertinent to the photodegradation of NEMACUR stretches only between about 300 and 312 nm. The specific wavelengths of light emanated by the light source used in the study in Report No. 86171 are given in Figure 1 of the report. Light is emitted at 290, 298, 303, 312 nm, among others, providing a spectrum of light energy to NEMACUR in the region of its pertinent absorbance. Thus, we maintain that the light source used in the later photodegradation report is adequate to provide wavelengths of light absorbable by NEMACUR for photodegradation."

We can agree with the conclusions of the registrant from the information submitted.

3.0 CONCLUSIONS

3.1 The soil and aqueous photolysis data requirements for fenamiphos have been satisfied by this submission.

3.2 Fenamiphos is rapidly degraded in both soil ($t_{1/2}$ = 1.6 hr under the test conditions) and water ($t_{1/2}$ = 3.6 hr under the test conditions).

3.3 The major photodegradate is fenamiphos sulfoxide, which in turn photodegrades to the sulfone, sulfonic acid and other unidentified polar products.

Norma Kay Whetzel
November 15, 1984
Review Section No. 1
Exposure Assessment Branch
Hazard Evaluation Division

Ecological Effects Branch Reviews - Fenamiphos

Page 4 is not included. The page contains data submitted by Mobay Corporation and stamped confidential.