

US EPA ARCHIVE DOCUMENT

122804
SHAUGHNESSEY NO.

1
REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 12/14/81 OUT 1/19/82

FILE OR REG. NO. _____

PETITION OR EXP. PERMIT NO. 618-EUP-RN

DATE RECEIVED BY HED 12/14/81

DATE OF SUBMISSION 11/25/81

RD REQUESTED COMPLETION DATE 2/28/82

EEB ESTIMATED COMPLETION DATE _____

RD ACTION CODE/TYPE OF REVIEW 700/EUP-New Chemical

TYPE PRODUCT(S): I, D, H, F, N, R, S Insecticide (Biological)

DATA ACCESSION NO(S). 246358

PRODUCT MANAGER NO. G. LaRocca (15)

PRODUCT NAME(S) MK-936 0.0055%; MK-936 0.0055% [REDACTED], MK-936

0.0011%; MK-936 0.0011% [REDACTED]

COMPANY NAME Merck & Co., Inc.

SUBMISSION PURPOSE Proposed EUP for use on Fire Ants

SHAUGHNESSEY NO.	CHEMICAL, & FORMULATION	% A.I.
_____	_____	_____
_____	_____	_____
_____	_____	_____

INERT INGREDIENT INFORMATION IS NOT INCLUDED

MK-936 - EUP

100 Pesticide Label Information

100.1 Pesticide Use

Fire ant bait

100.2 Formulation Information

- 0.011% Fire ant bait
- 0.0055% Fire ant bait
- 0.011% Fire ant bait
- 0.0055% Fire ant bait



100.3 Application Methods, Directions, Rates

All four formulations will be applied at one pound of bait per acre. This rate corresponds to the following rates of active ingredient:

- 25mg/acre
- 50 mg/acre
- 25 mg/acre
- 50 mg/acre



Application will be made by fixed wing aircraft, helicopter or conventional ground equipment; in spring or fall or both in one, two, or three succeeding years.

100.4 Precautionary Labeling

This pesticide is toxic to fish and wildlife. Keep out of lakes, ponds or streams. Do not contaminate water by cleaning of equipment or disposal of wastes.

100.5 Proposed EUP Program

100.5.1 Objectives

The primary objective is to determine the effectiveness of MK-936 fire ant bait for control of red imported fire ants. Control will be measured by the reduction in numbers of active fire ant mounds in the treated plots. Longer range, the registrant seeks to determine how long an application that effects control will last and when an additional booster application must be made.

100.5.2 Duration/Date/Amount Shipped

It is proposed that this EUP be granted for a period of one year. At that time it may be necessary to request an extension of this or a modification of this program. However, the current information base on this product and on the red imported fire ant is such that

INERT INGREDIENT INFORMATION IS NOT INCLUDED

definition in size and scope of an experimental program for a duration of more than one year is impossible. Specific dates of EUP program are not provided. A total of 4000 pounds of fire ant bait (150 grams of active ingredient) will be shipped to participants.

100.5.3 Applications will be made by fixed wing aircraft, helicopter or conventional ground equipment.

100.5.4 Target Pests

Red imported fire ant (Solenopsis invicta)

100.5.5 Geographical Site Features

States in which MK-936 fire ant baits will be used are: Alabama, Florida, Georgia, Louisiana, Mississippi, and Texas.

100.5.6 Test Program Description/Features

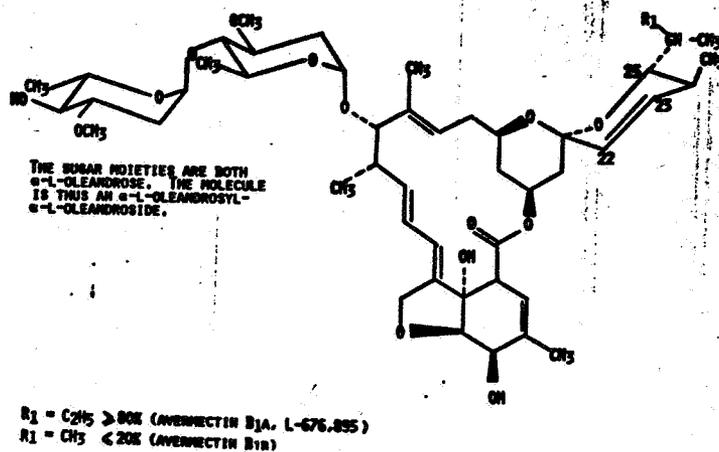
A maximum of 150 grams of active ingredient avermectin B, will be formulated into 4000 pounds of fire ant baits. These baits will be used to treat a maximum of 4000 acres of fire ant-infested pasture land and non-crop land in six Southeastern and Gulf Coast States. Applications will be made once or twice per year. An application will be made in March-April and/or October-November. Only one application will be made at each timing. Generally four experimental plots, of 50-100 acres each, per location will be treated. Applications will be made at the rate of 25-50 mg active ingredient per acre by fixed-wing aircraft, helicopter or conventional ground equipment. It is proposed that this experimental program be granted for a period of one year. At that time it may be necessary to request an extension of this or a modification of this program. However, the current information base on this product and on the red imported fireant is such that definition in size and scope of an experimental program for a duration of more than one year is impossible.

101 Physical and Chemical Properties

101.1 Chemical Name

5-0-Demethylavermectin A₁a

101.2 Structural Formula



101.3 Common Name

Avermectin B₁

101.4 Trade Name

MK-936

101.5 Molecular Weight

Avermectin B_{1a} - 873.10
Avermectin B_{1b} - 859.07

101.6 Physical State

An odorless, off-white to slightly yellow, crystalline solid.

101.7 Solubility

Water: < 0.01 mg/ml
Ethanol > 3 mg/ml

102 Behavior in the Environment

At the time of this review, environmental fate data had not been evaluated by EFB.

103 Toxicological Properties

103.1 References from Toxicology Branch

Toxicological data are not available at this time.

103.2 Minimum Requirements

103.2.1 Avian Acute Oral LD₅₀

Avian acute oral LD₅₀ study submitted with this application is not adequate to fulfill guideline requirements.

103.2.2 Avian Dietary LC₅₀

No acceptable avian dietary studies have been submitted on this chemical.

103.2.3 Fish Acute LC₅₀

Rainbow trout

3.2 (2.2-6.0) ppb - Technical (91.43%)

Core - EG & G Bionomics (1981) in Access. No. 246358.

Bluegill sunfish

9.6 (5.8-16.0) ppb - Technical (91.43%)

Core - EG&G Bionomics (1981) in Access. No. 246358

103.2.4 Aquatic Invertebrate LC₅₀

Daphnia magna

0.34 (0.28-0.39) ppb - Technical (91.43%)

Core - EG&G Bionomics (1981) in Access. No. 246358

103.4.5 Aquatic Phytotoxicity

Duckweed (Lemna gibba) 14-day EC₅₀

3.9 (2.3-6.5) ppm - Technical (91.4%)

Not rated - Hollister (1981) - in Access. No. 246358

Alga (Selenastrum capricornutum) 9-day EC₅₀

>100 ppm - Technical (91.4%)

Not rated - Hollister (1981) - in Access. No. 246358

The two phytotoxicity studies were sound and followed suggested protocols, but were not categorized due to a lack of requirement for such studies at this time.

5

104 Hazard Assessment

104.1 Discussion

The proposed application rates are 25 and 50 mg or 0.000055 and 0.0001 lb. a.i./acre. Assuming a direct application to a body of water 6" deep, and all the pesticide disassociating from the carrier, the following residues would be expected:

Rate (a.i./acre)	Concentration
0.055 lb.	0.04 ppb
0.11 lb.	0.08 ppb

Expected concentrations resulting from minimum and maximum application rates are in excess of 1/10 LC₅₀ for Daphnia magna, but are well below 1/10 LC₅₀ for both fish species tested. No information is available on the long term effects of MK-936 to aquatic organisms, so it is impossible to assess the hazard of chronic exposure at this time. Based on the above, information, it appears that MK-936 used at the proposed rates would not present an acute hazard to fish, but may pose a hazard to aquatic invertebrates.

Applications made at the rate of 1.0 lb formulated product/acre result in 0.000057 and 0.0011g a.i./sq. ft.:

$$1.0 \text{ lb} = 453 \text{ g/A} = 0.01\text{g/Sq. ft.}$$

$$\text{FP} = 0.0055 \text{ and } 0.011 \% \text{ a.i.}$$

$$= 0.000057 \text{ and } 0.00011\text{g a.i./sq. ft.}$$

Acceptable acute and subacute avian studies are not available at this time. [REDACTED] is very attractive to many birds, so definitive avian LD₅₀ and LC₅₀ studies will be required for conditional registration.

104.2 Likelihood of Exposure to Non-target Organisms

Based on the presently available toxicity data and the use rates, the exposure to non-target aquatic and terrestrial organisms is estimated to be low. If used according to label directions contamination of aquatic environments should be minimal. Likewise the low applicatoin rates are expected to minimize exposure of avian and other terrestrial species.

104.3 Endangered Species Considerations

Until sufficient toxicity data is available to perform a hazard assessment, the possible effects of MK-936 on

INERT INGREDIENT INFORMATION IS NOT INCLUDED

endangered species cannot be evaluated. The experimental use program calls for MK-936 to be used as follows:

<u>State</u>	<u>Acreage</u>	<u>Bait(lbs)</u>	<u>Active Ingredient(g)</u>
Alabama	800	800	30
Florida	400	400	15
Georgia	400	400	15
Louisiana	800	800	30
Mississippi	800	800	30
Texas	<u>800</u>	<u>800</u>	<u>30</u>
Total	4000	4000	150

MK-936 should be used with care in areas that may be inhabited or frequented by endangered species.

104.4 Adequacy of Toxicity Data

Avian acute oral LD₅₀ and dietary LC₅₀ studies submitted with this EUP application are not adequate to fulfill guideline requirements concerning avian testing.

104.5 Additional Data Required

One acceptable single-dose oral LD₅₀ on an upland gamebird (preferably bobwhite quail) and two acceptable 8-day dietary studies on one species of waterfowl and one species of upland gamebird are required prior to consideration for registration.

107 Conclusions

The Ecological Effects Branch has concluded that the issuance of this EUP should not cause unreasonable adverse effects to non-target organisms.

107.1 Data Adequacy Conclusions

The submitted aquatic invertebrate and fish toxicity studies on the technical material have been reviewed and determined acceptable to support registration. The avian acute oral and 8-day dietary studies are not adequate to support registration. Aquatic studies performed with the formulated product are not adequate to support registration. The phytotoxicity studies were reviewed, but were not categorized due to a lack of requirement for such studies at this time.

107.2 Data Requests

The following studies are required before EEB can perform a complete hazard assessment:

1. avian acute oral LD₅₀ (preferably on bobwhite quail, which are less likely to regurgitate),
2. avian subacute dietary LC₅₀ on one species of waterfowl (preferably mallard duck), and
3. avian subacute dietary LC₅₀ on one species of upland gamebird (preferably bobwhite quail).

8

Mary L. Gessner Mary L. Gessner 1/19/82
Fisheries Biologist, Section 3
Ecological Effects Branch, HED

Dave Coppage David J. Coppage 1/19/82
Head, Section 3
Ecological Effects Branch, HED

Clayton Bushong Clayton Bushong 1/19/82
Branch Chief
Ecological Effects Branch, HED