5-26-76 (3)

EEB BRANCH REVIEW

DATE: IN 2/6/76 OUT 5/26/76 IN ____ OUT ____ IN ____ OUT ____

FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. 10350-R

PETITION OR EXP. PERMIT NO. 6H5112

DATE OF SUBMISSION

DATE RECEIVED BY EEB 12-17-75

DATE COMPLETION REQUIRED

TYPE PRODUCT(S): I, D, (H,) F, N, R, S Aquatic Weed Control

PRODUCT MGR. NO. Jacoby

PRODUCT NAME(S) Mariner Brand Aquatic Herbicide System F

COMPANY NAME 3M Comp.

SUBMISSION PURPOSE Registration

CHEMICAL & FORMULATION Endothall Acid [7-oxabicyclo (2.2.1) heptane-2,3-dicarboxylic acid]

100.0 Pesticidal Use

For use only in non-flowing lakes, ponds, ditches and canals to control aquatic weeds.

100.1,.2 Application/Methods/Rates

Application is best made using mechanical broadcast methods such as spreader-seeder of the centrifugal type, or a blower. Application can also be made by mixing the product with water and applying the slurry of the product to the surface of the water via spraying. Water Temperatures should be at least 60° at the time of treatment. Treat only 1/3 - 1/2 of the water area in a single operation.

DOSAGE RATE CHART

Common Name	Scientific Name	Dosage Rate*
coontail	Ceratophyllum demersum	50-100
elodea	Elodea canadensis	75-125
hydrilla	Hydrilla verticillata	100-200
naiad	Najas spp.	50-100
pondweed	Potamogeton spp.	50-100
watermilfoil	Myriophyllum spp.	50-100
widgeon grass	Ruppia maritima	75-100

*pounds of product per acre

101.0 Chemical & Physical Properties

101.1 Chemical Name

[7-oxabicyclo (2.2.1) heptane-2,3-dicarboxylic acid].

101.2 Common Name

Endothall acid

102.0 Behavior in the Environment

102.2 Water

Results indicate that endothall diffuses throughout the treated body of water; that the weeds die only in the treated area; and that endothall is rapidly biodegraded by the microorganisms present in the body of water. Endothall concentrations rapidly decrease to near zero by the 14th day post-treatment.

103.0 Toxicological Properties

103.1 Acute Toxicity

103.1.1 Mammal

Organism	Test	Result	Material
Rat	Acute Oral LD_{50}	38 mg/kg	Technical
"	Inhalation	200 mg/m^3 (no effect)	"
Guinea pig	"	50 mg/m^3 (transient irritation)	"
Rabbit	Topical	Non-sensitive	"
"	Optical	Transient eye irritation	"
Rat	Acute Oral LD_{50}	4,560 mg/kg	System E
"	Optical	Mildly irritating	"
"	Topical	Minimal	"

103.1.3 Fish

Organism	Test	Result	Material
Bluegill	96-hr. TLM_{50}	102-140 ppm	19.2 solution
Largemouth Bass	"	200 ppm	"

103.1.4 Aquatic Invertebrate

Organism	Test	Result	Material
Daphnia magna	IC_{50}	46 ppm	Endothall acid

103.2 Subacute Toxicity

103.2.1 Mammals

Subacute 4 week feeding tests in rats at dose levels of 10,000 ppm mixed in the diet resulted in 100% mortality in males and 85% in females with the first week of feeding. No deaths occurred at the 1,000 ppm level.

103.3 Chronic Toxicity

103.3.1 Mammals

Rats - A two year feeding study in rats at levels ranging from 100 to 2,500 ppm added to the feed in capsules, showed no statistically significant differences in survival between control and test groups. Weight records, hematological studies and pathology findings were similar for control and test groups.

103.4 Field Toxicity

103.4.3 Fish Study

The dihydroxy aluminum salt of endothall (7-oxabicyclo (2.2.1) heptane-2,3-dicarboxylic acid) was evaluated over a 2.5-year period in 0.5 to 0.75 A ponds with little effect being shown on the fishery environment. Ponds treated once with 2 ppmw endothall (a.e.) had the same fish production as control ponds. Fish production was increased in ponds treated with 4 ppmw endothall a.e. The increased production was related to more effective control of submersed weeds. Dense aquatic weed growths in control ponds cause a stunted and unbalanced fish population. Histopathological examination of adult fish removed from the ponds at the termination of the study showed no effect of the herbicidal treatment. Plankton and benthic organisms were affected after treatment, but they had recovered in 5 to 7 weeks. The greatest effect on water quality was the depletion of dissolved oxygen. There was also a change in carbonate levels and pH. The effect of the herbicide on changes in water quality, plankton, and benthic organisms was not a direct toxicity, but the altering of the environment from decomposing vegetation.

Complete biological degradation of endothall had occurred in the water of all ponds within 15 to 21 days. There was a rapid disappearance of endothall from the water between 7 and 15 days after application. Fish flesh showed a very low absorption of endothall with greater concentrations being found in the viscera.

104.0 Hazard Assessment

104.1 Discussion

104.1.1 Adequacy of data

Not acceptable - complete studies on fish and wildlife toxicity data were not submitted. These studies were only summarized or referenced.

104.1.2 Additional data required - See Conclusion 105.0

104.1.3 Likelihood of exposure to non-target organisms

In addition to following comments see review by J. Akerman (9/10/75 - Endothall)

The greatest hazard from this product is not direct toxicity to non-target organisms but the altering of aquatic environments from decomposing vegetation. If label directions are followed, (i.e., only 1/3-1/2 of the water area is treated in a single operation) however, this problem should be minimal.

105.~~0~~ Conclusions

1. As per Sec. III of the Regulations and proposed Guidelines, certain basic tests are required for a product prior to registration. Examination of submitted data shows that certain of these tests are missing. They include:

   a. An acute oral LD_{50} for 1 species of waterfowl or 1 species of upland game bird.

   b. An 8-day dietary LC_{50} for 1 species of waterfowl and 1 species of upland game bird.

   In addition, for those tests that were included with the submission, only summary data were submitted. In order to evaluate the adequacy of such data the complete study, including material and methods, must be submitted. Based upon the adequacy of these studies certain additional studies may or may not be required.

2. The environmental safety review staff objects to the registration of this product for the aforementioned reasons.

R. W. Felthousen 5/26/76
Environmental Safety
Efficacy and Ecological Effects Branch