2-27-74

Environmental Chemistry Evaluation of Endothal 7-oxabicyclo (2.2.1) heptane-2,3-dicarboxylic acid as the mono(N,N-dimethylalkylamine)salt

2/27/74

PP# 3F1416

EPA File Symbol 4581-EOU

Submitted by Pennwalt Corporation, June 18, 1973

I. Introduction

1. Applicant proposes the use of the herbicide endothal on rice, with a negligible residue tolerance of 0.05 parts per million in or on rice grain as expressed as endothal.

2. Product name is Hydrothol 191 Rice Herbicide.

3. See previous evaluations, especially evaluation of PP 0F0972 dated 6/8/70.

4. EPA Reg. No. 4581-172 Hydrothol 191 Granular is registered for use of endothal in irrigation and drainage canals, and lakes and ponds.

II. Directions for use - For California Only

Apply 40-60 lbs Hydrothol 191 per acre (2.0 - 3.0 lbs active ingredient acid equivalent) 25 - 60 days after sowing, when aquatic weeds are present.

Dosage is dependent upon water depth:

4-6 inches use 40 lbs/A 2.2-1.5 ppm acid equiv.
6-8 inches use 50 lbs/A 1.9-1.4 ppm acid equiv.
8-10 inches use 60 lbs/A 1.7-1.4 ppm acid equiv.

Apply with ground or air equipment designed for uniform distribution of granules. Do not apply before rice emerges above surface of water. Do not apply more than once yearly. Do not apply after rice starts heading. Do not release water from flooded fields within 10 days of application. Do not use treated water for domestic purposes or for watering livestock within 10 days of application. Do not use fish from treated water for food or feed within three days after treatment.

III. Discussion of Data

A. Endothal residues in water after application of Hydrothol 191 Granular on Rice.

Two pounds a.i. per acre acid equivalent

Days after application	S+S ppm	Mehring ppm
1	ND	ND
2	0.47	0.42
5	0.42	0.46
7	0.20	0.15
10	0.06	ND
28	ND	ND

ND = < 0.01 ppm

Water temperature not given. Water depth not given. Water pH not given. Analytical method not given.

B. Endothal residues in fish

Previously submitted and evaluated data indicates that endothal is rapidly metabolized by goldfish and silver salmon fingerlings to naturally occurring metabolic constituents. See PP 0F0972. Additional fish residue study not indicated at this time.

C. Metabolism of Endothal by Aquatic Microorganisms, Published: J. Agr. Food Chem. V. 21 #3, 1973, p 403. Endothal readily degraded by microorganisms in lake water and hydrosoil into cell intermediates such as glutamic, aspartic, and citric acids, and alanine. Authors conclude that endothal is metabolized by tricarboxylic acid cycle and another, unknown, pathway.

D. Persistence of Endothall in Aquatic Environment as Determined by GLC.

Published: J. Agr. Food Chem. V 21, #5, 1973, p. 843.

Water and hydrosoil of lake and in laboratory aquaria. Endothal more persistent in laboratory aquaria than in field. Endothal more persistent in hydrosoil than in water. Pond water @ 2 ppm endothal could not be detected after 36 days. Pond hydrosoil endothal could be detected after 44 days. Aquaria water @ 2 and 4 ppm endothal could not be detected 7 days later. Aquaria hydrosoil from above treatments took 2 and 4 weeks respectively to reduce endothal residues to less than 0.1 ppm. Sterilized water-hydrosoil aquaria showed no loss of endothal after 9 days. Authors conclude microorganism metabolism is causative for degradation. Halflife in pond water about 16 days, with concurrent increase in hydrosoil residues then decline in both water and hydrosoil. New GLC procedure used to determine endothal residues: Endothal converted to N-chloroethylimide derivative before GLC.

E. On page G-4, applicant states that they are currently collecting data on crops residues resulting from irrigation with endothal treated waters. This data should be submitted in support of PP 3F1416.

IV. Conclusions

1. See evaluation dated 6/8/70 of PP 0F0972 in which the following conclusions are made:

A. Endothal metabolized conpletely to CO_2, H_2O and plant constituents.

B. Halflife is less than 2 weeks in soil.

C. Endothal degraded by U.V.

D. Endothal degraded by microorganisms.

E. Absorbed by soil, desorbed.

F. Can leach or runoff but degraded.

G. No accumulation in fish.

I. Environmental data is adequate.

V. Recommendations:

A. Object the registration with the following comments:

1. Submit the residue data on upland crops receiving irrigation water from treated rice fields when available.

2. The implied environmental safety claim "This product is biodegradable" should be deleted.

3. It is our understanding that fish in rice field in California are not used for food or feed. If this is not true, a fish residue accumulation study may be needed. Please varify with California Agriculture Extension people. Data may be needed to support the 3 day restriction in "Do not use fish from treated water for food or feed within three days after treatment."

4. If a rice use is proposed in areas outside of California, a crawfish and catfish residue accumulation study may be needed.

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