US EPA ARCHIVE DOCUMENT

3/14/75

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

PP 4G 1449
Temp. Permit 4581-EXP-X
Submitted by Pennwatt Corporation, February, 1975

I. RECOMMENDATIONS

No adverse environmental chemistry comments at this time.

2. INTRODUCTION

See previous environmental chemistry evaluation of 2-27-74 regarding PP3F1416, EPA File Symbol 4581-EOV. Also, see evaluation 6-8-70 of PP0F0972. Product name is either Hydrothol 191 Rice Herbicide or Hydrothol 191G Rice Herbicide. The proposed label identifies product as Hydrothol 191 which is registered product containing 53.0% active ingredient (23.36% acid equivalent) whereas the proposed ingredient statement claims 11.2% active ingredient (5% acid equivalent) in granular form.

See Temp. Permit 4581-EXP-18G issued 7-2-74 for Hydrothol 191 Rice Herbicide (rice grown for seed only).

3. DIRECTIONS FOR USE

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 equivalent

6-8 inches use 50 lbs./A 1.9-1.4 ppm acid equivalent

8-10 inches use 60 lbs./A 1.7-1.4 ppm acid equivalent

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.

4. DISCUSSION OF DATA

4.1 Residue Data on Irrigated Upland Crops

Applicant submits residue data on crops irrigated with water containing endothall residues. However, some data is derived from the potassium salt formulation and the remainder of the data is on mono- and di-cocoamine salts of endothall but none of the data is derived from the granular formulation of the mono-cocoamine salt (5% acid equivalent).

The data is of summary nature, with the active ingredient being placed into the irrigation water immediately prior to irrigation rather than 10 days after treatment of the water as per rice label. Although the data does not specifically address residues in crops irrigated with treated rice field water, the data is probably relevant to expected residues on crops irrigated with treated rice field water. A wide variety of crops were irrigated by overhead sprinkler, or furrow irrigated and analyzed for residues at intervals from 2 hours up to 28 days after treatment. Crops include zuccini, beans and foliage, red beets and tops, orange peel and pulp, lemon peel and pulp, strawberries and raspberries, squash, tomatoes, peanuts, corn husk and ears, turnips and tops, peppers, cantaloupe, tomatoes, soybean foliage, potatoes, cucumbers, lettuce, cabbage, sugar beets and tops, alfalfa, barley. Residues in these crops were generally not detectable at 0.02 ppm sensitivity except in foliage parts such as beet (sugar and red) tops, turnip tops, soybean foliage, lettuce, cabbage. Residues generally declined to low or non-detectable levels after several days. However, the summary nature of the data precludes estimation of possible residues in these crops at harvest, since applicant does not specify time interval between sample collection and harvest. That is, we have no information on the maturity of crop when sampled.

While not conclusive, data demonstrates little likelihood of significant endothall residues on crops irrigated with rice field outflow water.

4.2 Residue Accumulation in Fish

4.2.1 The applicant was requested to verify with Agricultural Extension Service that fish from rice paddies are not used as food or feed. The response is a letter from Agricultural Extension Service of the University of California (John F. Williams).

The major fish in rice fields is carp and occasionally sunfish and suckers. Rice fields are rarely fished for these species. Crayfish occur in almost all rice fields and are

occasionally captured when field is drained prior to harvest. Crayfish captured in this manner are used for fish bait, laboratory specimens and human food. Carp captured this way are rarely used as human food.

4.2.2 Applicant also submits data on residues found in fish in treated water. Data are collected in 24 locations in various bodies of water including irrigation canal and plastic pools, up to areas of 20 surface acres. Applicant does not specify depth of water bodies nor flow rate of the water in these bodies.

Water bodies were treated at rates between 0.2 ppm and 5.0 ppm acid equivalent with 6 various formulations, none of which are the rice herbicide formulation. One formulation granular, one pelletized and four liquid formulations were studied. Residues in water and one-or-two species (in each location) of the seven species bluegill, bass, bullhead, catfish, redear sunfish, and rainbow trout. Samples were taken over intervals between 2 hours and 25 days but mostly 1 day to 15 days. Mortality of fish in treated water is not described. Portion of fish analyzed is not specified.

Results:

Of 104 fish samples analyzed, 67 samples had no detectable residue at sensitivity of 0.02 ppm, and 37 fish samples contained finite and measurable residues. Of the 37 fish samples containing residues, the highest level found was 0.13 ppm (catfish 2 hours after 3.0 ppm treatment) while lowest was trace (calculated as 0.01 ppm) and average was 0.043 ppm. When all fish samples were averaged, the level was 0.01 ppm. Residues in all fish decline as interval after treatment increases.

Conclusions:

Endothall derived from various formulations other than proposed formulation does not accumulate in fish (unspecified portion). Data on accumulation in fish from proposed formulation and proposed use pattern are not submitted.

4.2.3 Fish Accumulation Study Using 14C-Endothall

Comet goldfish and crayfish were exposed to cold or radio label endothall at rate about 2.5 ppm acid equivalent derived from unspecified form of the active ingredient for 14 days. Aquatic plants and hydrosoil also in test tanks.

Fish samples consisted of filets of goldfish and crayfish tails. Water samples also analyzed. The information about this study is basically inadequate, in that the position of the radiolabel in the endothall moiety is not specified, the type of formulation of endothall used to treat the water is not specified, and the results of radioassay of fish samples are not reported.

Results - Cold Study:

No detectable residues in goldfish or crayfish at sample intervals up to 8 days, analysis discontinued thereafter.

Results - Radiolabel Study:

No data on fish since the control and treated samples contained 14C. Residues of 14C equivalent to endothall declined to about 0.1 ppm at day 14 in water with fish only, and to 0.05 ppm in water with fish, weeds, and mud.

4.2.4 Catfish Accumulation Study

Catfish exposed to cold and radiolabeled endothall for period of 5 days in water with or without hydrosoil. Position of radiolabel was ring-1,2-14C. Apparently, the dipotassium salt of endothall was used to treat the water at the rate of 2.0 ppm. 14C residues in filet, skin and viscera examined by liquid scintillation following wet oxidation. Nature of radiolabel moiety in fish not examined. Cold endothall examined in fish tissue after extraction, derivatization and quantitated by GLC.

Results:

No detectable residues in catfish filet by GLC at sensitivity of 0.02 ppm. No accumulation of 14C in filet over 5 day interval. Skin had no accumulation. Viscera accumulated up to -.47 ppm of 14C equivalent to endothall by day 3. Day 5 viscera not examined. Not much difference in residues between hydrosoil and non-hydrosoil fish.

Conclusions:

Endothall and 14C equivalent to endothall do not accumulate in edible portions of catfish. Viscera had accumulation of about 0.25 X by 14C assay on day 3. Study is inadequate since sampling interval was only 5 days and not 28-42 days per guidelines.

5. CONCLUSIONS

Although very little of the submitted data on residues in crops irrigated with rice field outflow water and on residues in fish in endothall-treated water is directly relevant to the proposed use pattern, the evidence is persuasive that there is little or no environmental chemistry hazard to irrigated crops or to fish in water containing residues of endothall.

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