109901

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EE BRANCH REVIEW

DATE: IN 1-8-80 OUT 2/7/80

FILE OR REG. NO. 3125-EUP-RAL & RAO

PETITION OR (EXP. PERMIT NO.) OG2300

DATE DIV. RECEIVED 1/8/80

DATE OF SUBMISSION 1/3/80

DATE SUBMISSION ACCEPTED

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

DATA ACCESSION NO(S). ?

PRODUCT MGR. NO. 21 - Panebianco

PRODUCT NAME(S) BAYLETON® 50% W.P. Fungicide

COMPANY NAME Mobay Chemical Corp.

SUBMISSION PURPOSE EUP's on Apples & Pears and on Grapes

CHEMICAL & FORMULATION Bayleton: 1-(4-Chlorophenoxy)-3,3-dimethyl-1- (1H-1,2,4-triazol-1-yl)-2-butanone 50%

Inerts 50%

Bayleton® (Triadimefon)

100 Pesticidal Use

Control of certain diseases on apples and pears (fresh market only) (EUP-RAL) and grapes (EUP-RAO)

100.1 Application Method/Directions

MIXING: The enclosed packets containing BAYLETON 50% Wettable Powder fungicide are water soluble. Do not allow packet to become wet prior to adding to the spray tank. Do not handle with wet hands. Reseal outer bag to protect remaining packets.

To prepare the spray mixture, drop the required number of unopened packets, as determined under "Recommended Application," into the spray tank while filling with water to the desired level. Operate the agitator while mixing. Depending on the water temperature and the degree of agitation, the packets should be completely dissolved within approximately 5 minutes from the time they were added to the water. Do not mix with oil.

DOSAGE: Use specified dosage of BAYLETON 50% Wettable Powder in the amount of water necessary to give complete coverage of foliage. Determine the total amount of wettable powder to be added to the spray tank based on the rates under "Recommended Applications." For each 1/2 pound (8 ounces) of wettable powder to be added to the spray tank use one 8-ounce packet. For example, if it is determined that 2 pounds (32 ounces) of BAYLETON 50% Wettable Powder should be added to the spray tank, add four 8-ounce packets. The type of equipment used will determine the concentration required; however, use of these packets is not recommended for making highly concentrated mixtures such as used in aircraft spraying.

CAUTION: Do not use these PVA water soluble packets in a tank mix with products that contain boron or release free chlorine. The resultant reaction of PVA and boron or free chlorine is a water insoluble plastic that will plug the spray rig. This plastic is not soluble in solvents such as diesel oil, kerosene, gasoline, alcohol, etc.

100.2 Application Rates

EUP-RAL

CROP	DISEASE	Ounces BAYLETON 50%WP per 100 gals. water	REMARKS
Apples Pears (Fresh market only)	Powdery mildew Cedar-Apple rust	Protective Rate 1/2 to 1 (1/4 to 1/2 AI) Post-infection Rate 1 to 2 (1/2 to 1 AI)	Apply specified dosage per 100 gallons of water in a uniform spray applied to the point of drip with conventional spray equipment. Concentrate sprays may be applied provided the amount of BAYLETON 50% W.P. applied per acre is the same as that which would be applied per acre in a full coverage spray. See NOTE below. BAYLETON 50% W.P. may be tank-mixed with other fungicides, insecticides, and miticides. BAYLETON 50% W.P. may be applied up to day of harvest. Do not apply more than a total of one pound (16 ounces) of BAYLETON 50% W.P. (8 oz AI) per acre in any single application. Do not apply more than 4 pounds (64 ounces) of BAYLETON 50% W.P. (2 lb AI) per acre per crop season. Do not graze grass under treated trees. Protective Rate Spray Program: Make the first application at the greentip stage. Make additional applications at normal intervals recommended for your area. Post-infection Rate Spray Program: Make the first application when disease first appears. Make additional applications as necessary to maintain control. Protective sprays may follow.

NOTE: In order to apply the correct amount of BAYLETON 50% W.P. to your orchard you must know the number of gallons of water needed to spray one acre of your trees to the point of drip. If you do not already know this gallonage, you should conduct a test to determine it. If you do not know how to conduct such a test with your equipment, you should ask assistance from your equipment dealer.

CROP	DISEASE	Ounces BAYLETON 50% WP per Acre	REMARKS
Grapes	Powdery mildew Black rot	2 to 6 (1 to 3 AI)	Apply specified dosage per acre as necessary in a full coverage foliar spray. Apply at least 20 gallons of spray solution per acre with ground equipment, and at least 10 gallons of spray solution per acre with aircraft equipment. Do not apply more than 18 ounces of BAYLETON 50% WP (9 oz AI) per crop season. Do not apply within 14 days of harvest. Multiple Application Program Using the lower rates makes the first application before bloom and continue application on a 7 to 10 day schedule. Minimum Number of Applications Program Use high rates. Make three applications: the first before bloom, the second at bloom, and the third at 7 to 8% sugar content.

100.3 Precautionary Labeling

ENVIRONMENTAL HAZARDS

Do not use on other crops grown for food or forage. Keep out of lakes, streams, and ponds. Do not contaminate water by cleaning of equipment or disposal of wastes. Apply this product only as specified on this label.

Do not make applications when weather conditions favor drift from target area.

100.4 Proposed EUP Program

100.4.1 Objectives

To obtain data under commercial use conditions on efficacy against certain diseases on grapes (EUP-RAL) and apples and pears (fresh market only) (EUP-RAO).

100.4.2 Duration/Date/Amount Shipped

From February 1, 1980 to December 31, 1982.

Apples and Pears - (EUP-RAL) - 370 lbs Bayleton 50% WP
(185 lbs AI)

Grapes - (EUP-RAO) - 325 lbs Bayleton 50% WP
(162.5 lbs AI)

100.4.3 Target Pests

Apples and Pears - (EUP-RAL) - Powdery mildew
Cedar-Apple rust

Grapes - (EUP-RAO) - Powdery mildew
Black rot

100.4.4 Geographical Site Features

Apples and Pears - (EUP-RAL)

STATE	ACRES	SUPERVISORS
Washington	50	H. L. Ramsey C. E. Joplin
Oregon	20	C. E. Joplin
Idaho	10	D. N. Byrne H. L. Ramsey
Utah	10	D. N. Byrne
California	15	R. P. Watwood J. N. Sagaser S. D. Murrill
Michigan	10	J. F. Smith
Ohio	5	R. P. Hayne
New York	15	R. H. Ackerman
Pennsylvania	10	E. A. Cunningham
West Virginia	5	E. A. Cunningham
New Jersey	5	P. M. Grehlinger
Virginia	15	S. M. Woodall
Colorado	5	J. E. Anderson
Missouri	5	L. M. Chan
Kansas	5	D. R. Gigax

Grapes - (EUP-RAC)

STATE	ACRES	SUPERVISORS
Washington	20	H. L. Ramsey
Oregon	20	C. E. Joplin
California	200	R. P. Watwood J. N. Sagaser S. D. Murrill K. Roever
New York	50	R. H. Ackerman

101 Chemical and Physical Properties

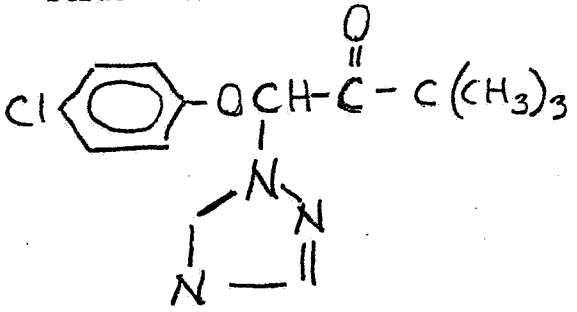
101.1 Chemical Name

1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone

101.2 Common Name

Triadimefon (BAY 8364, MEB 6447)

101.3 Structural Formula



101.4 Molecular Weight

293.7

101.5 Physical State

White to tan crystals; odorless to mild aromatic.

101.6 Solubility

Water - 260 ppm at 20°C
Cyclohexanone - 35%
Toluene - 25%
Isopropanol - 17%
Methylene Chloride >50%
Ligroin - 25%

102 Behavior in the Environment

(Reference: Expanded from L. Turner's (1/12/79) citation of K. Sampson/R. E. Ney Environmental Fate Review, 8/8/78).

102.1 Soil

In laboratory studies, the half-life of Bayleton was six days in aerobic soil and 15 days in anaerobic soil. Since there was no degradation in sterile soils, microbial action on Bayleton seems a likely route of degradation. In field studies the average half-life was five days, but the half-life of Bayleton plus its primary degradate (KWG-0519) was 225 days. KWG-0519 is considered persistent.

"Aged" soil residues of Bayleton were substantially mobile in sandy clay loam and silty clay soils in column leaching and soil TLC experiments. In the column part, 73% of the original ^{14}C activity was found below 5 cm. However, relatively low leaching ability of "fresh" Bayleton was noted in a different soil TLC study. Lack of experimental procedures prevented ascribing different results to aging or use of differently labeled parent compounds.

102.2 Water

Bayleton is stable to hydrolysis at pH 3, 6 and 9 and temperatures of 25°, 35° and 45°C. It will photolyze in water with a half-life of 10-12 hours. Addition of 2% acetone accelerated the half-life to 5.5 hours. 1,2,4-Triazole and CO_2 were the major photoproducts from triazole- and benzene ring-labeled studies.

In a simulated pond environment, Bayleton has a half-life of 6-8 days in the water and 18-20 days in the silt. The major degradate was again KWG 0519.

102.3 Soil Microorganisms

There is little inhibition of several soil microbes by Bayleton. However, when nitrogen-fixing symbionts in soybean nodules were exposed to 0.5 ppm Bayleton for four weeks, the plants showed a 60% decrease in shoot length, 21% decrease in plant flesh weight and 29% decrease in nodule fresh weight as compared to controls. On the other hand, actual nitrogen-fixation (as measured by acetylene reduction on GLC) was not affected.

102.4 Plant

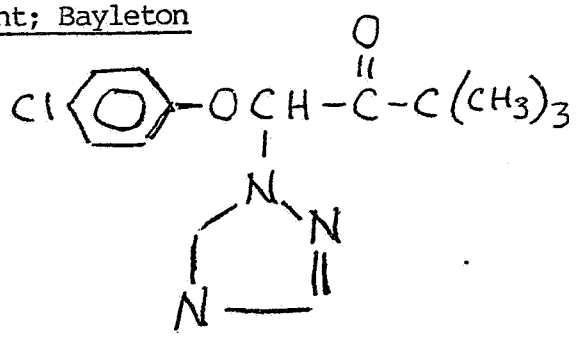
In barley plants and seeds, KWG 0519 is again the primary metabolite.

102.5 Animal

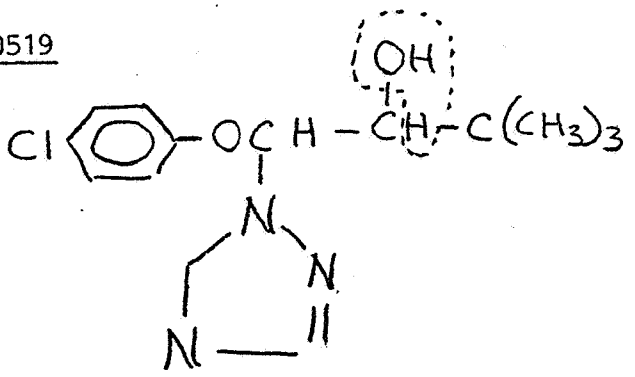
Bayleton accumulated in 28 days in catfish to levels of 6.5-7.6X in two flow-through tests at 10 and 100 ppb. Approximately 96% of activity was eliminated in the first seven to ten days of withdrawal.

102.6 Comparative Structural Formulas

Parent; Bayleton



KWG-0519



103 Toxicological Properties

103.1 Mammal

(Reference: Toxicology Branch memo by J. D. Doherty, 2/15/78).

Rat acute oral LD_{50} (25%WP)	=	2828 mg/kg male
Rat acute oral LD_{50} (25%WP)	=	3668 mg/kg female
Rat acute oral LD_{50} (50%WP)	=	812 mg/kg male
Rat acute oral LD_{50} (50%WP)	=	1470 mg/kg female
Rat acute oral LD_{50} (92% Tech)	=	568 mg/kg male
Rat acute oral LD_{50} (92% Tech)	=	363 mg/kg female
Mouse acute oral LD_{50} (92% Tech)	=	987 mg/kg male
Mouse acute oral LD_{50} (92% Tech)	=	1071 mg/kg female
Rabbit acute oral LD_{50} (Tech)	=	500 mg/kg female
Dog acute oral LD_{50} (Tech)	=	500 mg/kg female

Teratology

Three studies (oral in rats, inhalation in rats and oral in rabbits) showed no indication of embryotoxicity or teratogenesis at 50 mg/kg.

103.2 Fish and Wildlife

(Combined from previous EEB reviews)

Species	Test Type	Form	Toxicity	Status
Mallard	Acute Oral LD_{50}	Tech	>4,000 mg/kg	Core
Mallard	Dietary LC_{50}	Tech	>10,000 ppm	Core
Bobwhite Quail	Dietary LC_{50}	Tech	>4,640 ppm	Core
Bluegill	96-hr LC_{50}	Tech	11 ppm	Core
Rainbow trout	96-hr LC_{50}	Tech	14 ppm	Core
Channel catfish	96-hr LC_{50}	Tech	15 ppm	Core
Daphnia magna	48-hr LC_{50}	Tech	1.6 ppm	Core *

103.3 Beneficial Invertebrates

Honey Bees (*Apis mellifera*)

Contact and Oral LD_{50} (ug/bee) both greater than 25
Stevenson. 1978. Plant Pathol. 27(1):38-40
Reviewed by A. Vaughan, 11/5/79 (attached)
Reviewer's Conclusions: This study is scientifically sound.

Worms

A previous EEB review by J. Tice (4/19/78) cited a study on manure worms (*Eisenia foetida*) by Hermann, 1973. However, members of the genus *Eisenia* are commonly called manure worms because they require manure to live in. Members of this genus are the worms that are usually sold by commercial operators because they reproduce faster and year-round as opposed to *Lumbricus terrestris*. Manure worms, e.g. *E. foetida*, are also very resistant to a number of pesticides that are quite toxic to *L. terrestris*, and thus the use of manure worms "is quite unwise if the results are to be applied to other earthworms" (Stickel, W. H., in Foreword to Davey, S. P. 1963. Effects of chemicals on earthworms: A review of the literature. Bur. Sport Fish. Wildl., Spec. Sci. Rep. - Wildl. No. 74; see also Gilman, A. P. and A. Vardanis. 1974. Carbofuran. Comparative toxicity and metabolism in the worms *Lumbricus terrestris* L. and *Eisenia foetida* S.J. Agric. Food Chem. 22(4):625-28).

104 Hazard Assessment

104.1 Discussion

Bayleton is applied at relatively low rates, 8 oz AI/acre on apples and pears and 1-3 oz AI/acre on grapes. Multiple applications are recommended; at least four applications are possible at maximum rates on pome fruits (and more if at lower rates) and at least three are possible on grapes at maximum rates (again, more if at lower rates).

While Bayleton, as the parent compound may not be very persistent itself in the environment, its primary degradate in all studies, KWG 0519, certainly is. Note that the only metabolism that takes place is the reduction of the ketone group to a hydroxy group. Bayleton shows substantial mobility in sandy clay loam and silty clay soils. Little bioaccumulation, however, has been shown.

104.2 Likelihood of Adverse Effects

Due to its low toxicity to most organisms tested and its low application rates, little if any acute hazard of Bayleton is anticipated. Chronic and reproductive effects are possible, however, due to its multiple applications, its leaching and the extreme persistence of its primary degrate, KWG 0519, which is almost identical to the parent compound.

104.4 Adequacy of Toxicity Data

The six basic fish and wildlife data requirements have been submitted and found adequate to support registration.

104.5 Additional Data Required

For all future possible crop registrations, EEB requests copies of all reviews on residues and persistence of Bayleton and its primary metabolite, KWG 0519, in and on crops and leaves. Previous reviews by L. Turner (1/12/79) and J. Tice (4/19/78) have stated that avian reproduction studies may be required in the future. Information on persistence of Bayleton on food crops may help clarify this situation.

Bayleton has multiple applications, its primary metabolite (KWG 0519) is very persistent and aquatic contamination is likely via drift and leaching. Daphnia is by far the most sensitive aquatic organism tested. Therefore, a Daphnia life-cycle test will be required prior to consideration of registration of Bayleton on apples and pears and on grapes.

107 Conclusions

107.4 Data Adequacy Conclusions

The six basic fish and wildlife requirements have been submitted and found adequate to support registration.

107.5 Data Requests

For future possible crop registrations - and depending upon supporting crop residue information, and any additional Environmental Chemistry and Toxicology data - avian reproduction studies may be required in the future.

A Daphnia life-cycle test is required to support the proposed uses due to the multiple application of Bayleton, the extreme persistence of its primary metabolite (KWG 0519) and its potential for aquatic contamination from drift and leaching.

107.6 Special Notes

EEB requests copies of all reviews on residues and persistence of Bayleton and its primary metabolite, KWG 0519, in and on crops and leaves.

107.7 Recommendations

EEB does not object to the proposed EUPs on apples and pears (EUP-RAL) and on grapes (EUP-RAO).

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