109901
SHAUGHNESSEY NO.

32
REVIEW NO.

EEB BRANCH REVIEW

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RD ACTION CODE/TYPE OF REVIEW 335/Amendment

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

DATA ACCESSION NO(S).

PRODUCT MANAGER NO. H. Jacoby (21)

PRODUCT NAME(S) Bayleton 50 WP

COMPANY NAME Mobay Chemical Corporation

SUBMISSION PURPOSE Proposed conditional registration of apricots, nectarines, peaches, plums, prunes, cucurbits, and sugar beets

SHAUGHNESSEY NO.	CHEMICAL, & FORMULATION	% A.I.
109901	Triadimefon	50%

100 Pesticide Label Information

100.1 Pesticide Use

As a fungicide for use on stone fruits (apricots, nectarines, peaches, plums, prunes), curcurbits, and sugar beets.

100.2 Formulation Information

ACTIVE INGREDIENT

1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone.....50%

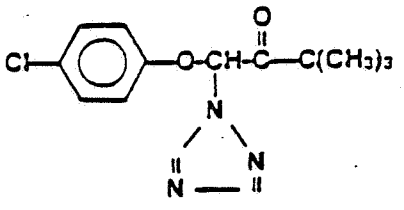
100.3 Application Methods, Directions, Rates

See attachment

101 Physical and Chemical Properties

(From EFB review 4-5-82, Stone Fruits)

Structural Formula:



Appearance:	White to tan crystals
Odor:	Odorless to mild aromatic
Molecular Weight:	293.7
Melting Point:	76°C (Technical)
Boiling Point:	Too high to measure
Vapor Pressure:	$<10^{-6}$ mbar @ 20°C
Density:	1.23 @ $\frac{20°C}{4}$ °C
Solubility:	Water 260 ppm @ 20°C Cyclohexanone 35% Toluene 25% Isopropanol 17% Methylene Chloride >50% Ligroin 25%
Dissociation Constants:	Does not dissociate

102 Behavior in the Environment (From EEB review by R. Balcomb, 1-5-82)

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

"Aged" soil residues of triadimefon 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" triadimefon 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

Triadimefon is stable to hydrolysis at pH 2,6, and 9 and temperatures of 25°C, 35°C, 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, triadimefon 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 triadimefon. However, when nitrogen-fixing symbionts in soybean nodules were exposed to 0.5 ppm triadimefon for four weeks, the plants showed a 60% decrease in shoot length, 21% decrease in plant fresh 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 LC) was not affected.

102.4 Plant

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

102.5 Animal

Triadimefon 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.

From J.M. worthington, RCB, 3/2/81 . "In conclusion the three animal metabolism studies demonstrate that Bayleton is rapidly metabolized and excreted with little or no tendency to concentrate in tissues. We consider the fate of Bayleton in animals adequately delineated for the purpose of the proposed temporary tolerances. KWG 0519, KWG 0519 acid, KWG 1323 and KWG 1342 are the principal metabolites found in animal tissues."

Note: above reference concerns cow, pig and poultry metabolism studies.

103 Toxicological Properties

103.1 Mammal (from 1-5-82 EEB review)

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

Acute Oral LD_{50}

Species	Formulation	LD50 (mg/kg)
Rat (male)	92 % Technical	568 mg/kg
Rat (female)	92 % Technical	363 mg/kg
Mouse (male)	92 % Technical	987 mg/kg
Mouse (female)	92 % Technical	1071 mg/kg
Rabbit	Technical	500 mg/kg
Dog	Technical	500 mg/kg
Rat (male)	50 % WP	812 mg/kg
Rat (female)	50 % WP	1470 mg/kg
Rat (male)	25 % WP	2828 mg/kg
Rat (female)	25 % WP	3668 mg/kg

Teratology

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

103.2 Minimum Requirements (from 1-5-82 EEB Review)

Species	Test Type	Formulation	Toxicity	Status
Mallard	Acute Oral LD50	Technical	>4,000 mg/kg	Core
Mallard	Dietary LC_{50}	Technical	>10,000 ppm	Core
Bobwhite	Dietary LC_{50}	Technical	>4,640 ppm	Core
Bluegill	96-Hour LC_{50}	Technical	11 ppm	Core
Rainbow trout	96-Hour LC_{50}	Technical	14 ppm	Core
Channel Catfish	96-Hour LC_{50}	Technical	15 ppm	Core
Daphnia magna	48-Hour EC_{50}	Technical	1.6 ppm	Core

103.3 Beneficial Invertebrates (From 1-5-82 EEB Review)

Honey Bees (Apis mellifera)

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

103.4 Avian Reproduction Studies

Species	Formulation	NEL	Validation
Bobwhite quail	Technical	20 ppm	Core, 9-9-82
Mallard duck	Technical	>500 ppm	Supplemental, 9-13-82

103.5 Embryo-larva and Life-Cycle Studies

Species	Formulation	LC50	RI 50	MATC	Validation
Daphnia magna	Technical triadimefon	178 ppb (21-d)	220 ppb	154-314 ppb	Core
Daphnia magna	Technical triadimenol*	283 ppb (21-d)	No impairment at $\leq$ 100 ppb	100-200 ppb	Core
Rainbow trout	Technical triadimefon	1270 ppb (17-d)	-	-	Supplemental

*Triadimenol is the primary metabolite of triadimefon. Registration is being sought for triadimenol under the name Baytan.

104 Hazard Assessment

104.1 Discussion

At the proposed application rates, the following concentrations may be expected in bodies of water of various depths (if the pesticide is applied directly to water). Also shown below are the pesticide concentrations which would result on avian food items (when the product is applied as directed).

Recommended Applications	ppb in water			ppm	
	6"	12"	24"	insects	fruit
Stone Fruits California only, 24-32 oz/ac (0.75-1.0 lb. ai)	551- 734	276- 368	138- 183	44- 58	5.2- 7.0
Other areas, 16 oz/ac (0.5 lb. ai)	367	184	92	29	3.5
Sugar beets 8-16 oz/ac (0.25-0.5 lb. ai)	184- 367	92- 184	46- 92	14.5- 29	-
Cucurbits 2-4 oz/ac (max. 0.125 lb. ai)	92	46	23	7	

104.2 Likelihood of Adverse Effects to Non-target Organisms

acute effects, aquatics

Triadimefon is only slightly toxic to fresh water fish with LC_{50} values ranging from 11 to 15 ppm. The proposed uses should not result in any acute hazard to fresh water fish. To Daphnia, however, triadimefon is moderately toxic, with an LC_{50} of 1.6 ppm. In the worst case situation of a direct application of the pesticide to water, mortality to aquatic invertebrates may be expected.

Stone fruits and sugar beets are largely grown in California (also Idaho and Colorado are important areas for beets) on level land which is irrigated (see addenda). Irrigation at least for stone fruits is mostly of a drip or sprinkler type. Little runoff and resulting contamination of aquatic sites is expected in these areas even at the high rate of application. The greatest potential for aquatic contamination exists perhapes in the non-irrigated areas of stone fruit and sugar beet production. The model of a five acre field draining into a one acre pond six inches deep will be used to estimate the degree of contamination. Assuming a 5% runoff and an additional 3% loss from the treatment area due to aerial drift, an application rate of 5.0 lb a.i./A would result in an Estimated Environmental Concentration of 147 ppb. This EEC value is less than 1/10 the LD_{50} to Daphnia (160 ppb) and indicates that a much higher rate of loss from the treated area would have to occur before a hazard to aquatic invertebrates would be expected.

Chronic effects, aquatics

Triadimefon plus its primary degradate, triadimenol, is very persistant in soil (225 days), and has been found to be "substantially mobile" in soil leaching studies. Because of these qualities, a potential may exist for long term contamination of a site and resultant chronic exposure of aquatic organisms. It should also be mentioned here that the proposed label allows for repeat applications (up to 4 times at the maximum rate) for both stone fruit use patterns.

Triadimefon and its degradate have been found to cause reproductive impairment in Daphnia magna at concentrations as low as 314 ppb and 200 ppb, respectively. In addition, a rainbow trout embryo-larva study has recently been received from the registrant as a separate submission. This study, as yet unvalidated, shows reproductive effects (death of larvae) at 890 ppb. In the previous section, an EEC of 147 ppb was calculated for a body of water 6" deep. This concentration is below the triadimefon MATC for Daphnia (154-314 ppb), and indicates that sustained levels high enough to result in reproductive effects to aquatic invertebrates are unlikely to occur. Additionally, no reproductive hazards to fish are anticipated based upon the results of the unvalidated trout study.

Acute and chronic effects, birds

Triadimefon is practically non-toxic to birds both when administered through the diet and as an acute exposure, but has been shown to cause reproductive impairment to bobwhite quail at concentrations of 100 ppm (the NEL is 20 ppm). At the proposed use rate on stone fruits, the resulting residues on the fruit are well below the NEL. Residues on insects occurring in the area would be higher but are probably well below a level which would result in chronic toxicity to insectivorous birds.

Incremental risk

Triadimefon is already registered for use on several crops, the most important of which are wheat and barley. The total acreage for wheat and barley is + 89,500,000 acres. Compared to the currently registered uses, the proposed uses on stone fruits and sugar beets involve much higher application rates (with the exception of almonds, grasses grown for seed, pine seedlings, and turf grasses, see addendum). However, the total acreage for the proposed uses is relatively small-390,000 acres for stone fruits and 1,376,000 for sugar beets. Secondly, Stone fruits(24-32 oz/A) and almonds (24-32 oz/A) overlap in California. Therefore, the proposed uses do not comprise a significant incremental risk to non-target organisms.

104.3 Endangered Species Considerations

A number of endangered fish species occur in areas in which stone fruits and sugar beets are grown, especially in the states of California and Arizona. As discussed in the previous section, there is a potential for pesticide contamination of aquatic sites with the proposed uses. Using the endangered species trigger of 1/20 the LC_{50} to fish (11 ppm), the concentration at which unreasonable acute hazard would be expected to endangered species (550 ppb) is well above any aquatic concentrations which may result from the proposed use patterns. Additionally, these expected concentrations should not result in chronic hazard to endangered fish species.

104.4 Adequacy of Toxicity Data

The data are adequate, however, a necessary fish embryo-larva study has been received but not yet validated by the Branch.

105 Conclusions

EEB has completed an incremental risk assessment of the proposed conditional registration of Bayleton 50 WP for use on stone fruits, sugar beets, and cucurbits. Based upon the available data, EEB concludes that the proposed uses provide for no significant increase in exposure or in acute and chronic risks to non-target organisms.

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Use patterns, Bayleton

Almonds - *24-32 oz/A; Max 64 oz/A/yr. Aerial appl.

Grasses grown for seed - *8-16 oz/A; Max 2 lbs./A/yr. Aerial Appl.

Apples - *2-8 oz/A; Max. 24 oz/A/yr. Aerial appl.

Grapes - *2-6 oz/A; Max. 18 oz/A/yr. Aerial appl.

Pine Seedlings - *4-16 oz/A; Max 4 applic. of 16 oz/yr. Aerial appl.

Pears - *2-8 oz/A; Max. 24 oz/A/yr. Aerial appl.

Wheat, Barley - *2-8 oz/A; Max. 16 oz/A/yr. Aerial appl.

Turf grasses - 5.445 lb ai/A. Aerial appl.

Azaleas - Max. 2-4 oz ai/A

* 50% W.P.