EC File

DATE: 8/18/78

To: Product Manager Wilson
TS-767

Through: Dr. Gunter Zweig, Chief
Environmental Fate Branch
G. Zweig 8/23/78

Through: Mr. James Conlon, Acting Director
Hazard Evaluation Division, TS-769

From: Review Section No. 1
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 3125-GEN, GRI, GRO

Chemical: 1-(4-chlorophenoxy)-3,3-dimethyl-1-(1 H-1,2,4-triazol-1-yl)-2-butanone

Type Product: I, D, (H,) F, N, R, S,

Product Name: Bayleton technical, 50% WP, and 25% WP

Company Name: Chemagro

Submission Purpose: Registration
Technical, 50% WP & 25% WP

Date in: 9-12-77

Date out: 6-26-78

FEB BRANCH REVIEW

DATE: IN _____ OUT _____ IN 9/12/77 OUT 6/26/78 IN _____ OUT _____

FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. 3125-GEN, GRI, GRO 320 318 319

PETITION OR EXP. PERMIT NO. _____

DATE DIV. RECEIVED _____

DATE OF SUBMISSION _____

DATE SUBMISSION ACCEPTED _____

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

PRODUCT MGR. NO. Wilson

PRODUCT NAME(S) Bayleton technical, 50%WP, and 25% WP

COMPANY NAME Chemagro

SUBMISSION PURPOSE Registration

CHEMICAL & FORMULATION ~~1-(4-chlorophenoxy)-3, 3-dimethyl-1-(1 H-1, 2, 4-triazol-1-yl)~~ -2-butanone

(Bay8364)

2

1.0 INTRODUCTION

1.1 Applicant proposes registration of Bayleton technical for manufacturing use and 50% and 25% wettable powder for use on azaleas.

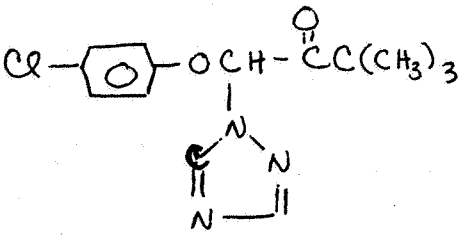
1.2 Physical and Chemical Properties (Technical)

Appearance:	White to tan crystals
Odor:	Odorless to mild aromatic
M.W.:	293.7
M.P.:	76°C
B.P.:	too high to measure
V.P.:	10^{-6} mbar at 20°C
Density:	1.23 at $\frac{20°}{4°}$ C
Solubility:	Water - ~~260~~ 70 ppm at 20°C
Dissociation Constants:	Does not dissociate

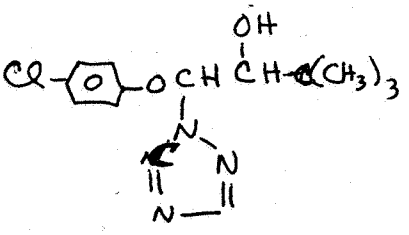
	BAYLETON 25% WP	BAYLETON 50 WP
Miscibility	miscible with water	miscible with water
Boiling point:	N/A	N/A
Flashpoint:	N/A	N/A
Specific Gravity/ Density:	Fluff - 15 lbs/cu.ft. Pack - 20 lbs/cu.ft.	Fluff - 12 lbs/cu.ft. Pack - 18 lbs/cu.ft.
Viscosity:	N/A	N/A
Vapor Pressure:	N/A	N/A
Explosive Characteristics:	No explosive properties	No explosive properties
Oxidizing/reducing Agent Capability:	No oxidizing or reducing properties	No oxidizing or reducing properties
Corrosive Hazards:	Not corrosive	Not corrosive

1.3 Other names: Bay 8364; MEB 6447; Triadimefon

1.4 Chemical Structure:



parent compound



KWG 0519

2.0 Directions for Use

2.1 For maximum control, BAYLETON should be applied in the expanded bud stages (color showing). Earlier application may be less effective. Making the application when the first flowers open assures proper timing. Early and late blooming varieties may require treatment on different dates. If such varieties are closely interplanted, two applications may be made to the entire planting.

RECOMMENDED APPLICATION

CROP	DISEASE	OUNCES	REMARKS
ORNAMENTALS			
Azaleas	Azalea Petal light (Ovulinia Azaleae)	Bayleton 50% WP 4 to 8 Bayleton 25% WP 8 to 16	Mix specified dosage in 100 gallons of water and apply as a full coverage foliar spray to point of run-off. IMPORTANT: For best control, application should be made during the expanded bud stage (color showing). Use the high rate for maximum protection. A second application may be made if needed.

2.2 ENVIRONMENTAL HAZARDS

Do not use on 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.

2.3 STORAGE AND DISPOSAL

1. PROHIBITIONS: Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited.

2. PESTICIDE DISPOSAL: Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies.

3. CONTAINER DISPOSAL: Dispose of in an incinerator or landfill approved for pesticide containers, or bury in a safe place.

3.0 DISCUSSION OF DATA

3.1 A Gas Chromatographic Method for Bayleton and KWG 0519 in Soil and Water. J. S. Thornton and C. M. Lloyd. 1-31-77. Report No. 51231.

A gas chromatographic procedure is described for the analysis of Bayleton and its metabolite, KWG 0519, in soil and water. Residues are extracted from soil by refluxing the sample in methanol-water. Following this, the residue is further cleaned up using an aqueous wash and then by a Florisil column. Analysis of the extract by gas chromatography employs a nitrogen-specific alkali flame detector with a non-polar standard column of 80-100 mesh chromosorb W (HP) packed with 10% DC-200 + 1.5% QF-1 and a polar confirmatory column of 80-100 mesh chromosorb W(HP) packed with 5% OV-210.

Conclusion. This is a supplementary study.

3.2 Pharmacokinetics in Mice and Rats

Bay e 8364 (MSR 6447) by W. Ritter. Report No. 50953.

BAY e 8364 was rapidly abosorbed by mice after receiving an oral dose of 100 mg/kg body weight. Two metabolites were found both in plasma and urine. the more polar one was identified chromatographically as the carbonyl-reduced parent compound (KW G 0519).

Conclusion. This is a supplementary study.

3.3 Stability of Bayleton in Sterile Aquatic Buffer Solutions. J. J. Obrist.

UL-14C at 5 ppm and 50 ppm was studied at pH values of 3, 6, 9 and 25°, 35°, and 45°C in sterile buffer solutions. Samples were analyzed by +lc and radiometric techniques using lss over a period of 28 weeks.

Bayleton was stable at all temperatures and pH values with 95-97% parent compound still remaining after 28 weeks. Half-life calculation for parent compound would be 398 weeks. Trace quantities of p-chlorophenol, symmetrical isomer, or KWG 0519 were found.

Conclusion. This is an acceptable hydrolysis study Applicant should clarify whether or not study was done in the dark.

3.4 Photodecomposition of Bayleton in Water Solutions. S. S. Nichols.

Aqueous solutions containing 5 ppm Bayleton-3, 5-triazol -^{14}C or Bayleton-ring-UL-^{14}C were irradiated in a controlled growth chamber equipped with alternating FS-20 sun lamps and F20T12-BL black lights, having an intensity of 100-1200 microwatts/cm2. A

6

2% solution of acetone was added in some of the solutions to mimic the sensitizing effect of dissolved organic substances.

A brief study of the photodegradation of 5 ppm Bayleton-ring-UL-^{14}C and 100 ppm Bayleton-3, 5-triazol-^{14}C was carried out using high intensity irradiation (high pressure quartz mercury vapor lamp). Water samples were extracted with chloroform and analyzed by TLC, GLC, autoradiography (LSS), and gel column chromatography.

The half-life of parent was found to be 10-12 hours using 5 ppm solutions. 1, 2, 4-Triazole was the major photoproduct from triazole-labeled Bayleton, while benzene ring-labeled Bayleton was degraded to $^{14}CO_2$ and an unidentified polymer (M. W. ~700).

Addition of 2% acetone accelerated the half-life to 5.5 hours. High intensity irradiation also increased the half-life to 8 hours. Temperature had little effect on the photolytic rate and the distribution of photoproducts.

Conclusion. This is an acceptable photolysis study.

Distribution of ^{14}C-containing Activity Resulting from Simulated Sunlight Irradiation 5 ppm Solution of BAYLETON-3,5-triazol-^{14}C and BAYLETON-ring-UL-^{14}C at 25°C

		Carbon-^{14} as Percent of Total Initial Activity[a]						
	Time (Hour)	0	2	4	8	12	24	48
Triazol Label	Parent[b]	98	86	80	65	50	24	6[b]
	Origin[b]	-	6.8	14	26	40	69	88[b]
	Unkown (Rf 0.31-0.35)	-	4	6	7	7	7	6
	Volatile Loss	-	3	1	1	2	1	1
	Diffuse Activity	2	3.2	0	2	3	0	0
Ring Label	Parent	98	85	74	58	42	20	5
	Origin	1	6	11	20	33	46	62
	Unknown (Rf 0.31-0.35)	-	4.8	5.6	9.1	9.7	13.6	9.7
	Volatile (CO_2)	-	3	6	9	12	19	22
	Diffuse Activity	1	1.2	3.4	3.9	3.3	1.4	1.3

[a]Determined by TLC on silica gel, developed with benzene:ethyl acetate (2:1)

[b]Identified as primarily 1,2,4-triazole by reverse isotope dilution. 1,2,4-Triazole identified in the original material represents 75% of the initial activity at 48 hours.

3.5 The Degradation and Fate of Bayleton in a simulated Pond Environment. 5-31-77. J. J. Obrist, etc. Report No. 53038.

Bayleton-ring-UL^{14}C and Bayleton-triazol-3,5-^{14}C were studied in a simulated pond environment. Bayleton had a half-life of 6-8 days in the water phase of the system and a half-life of 18-20 days in the silt phase. The major metabolite was BAY KWG 0519 in each study. Other identified metabolites included 1,2,4-triazole, ^{2}-1,^{2,4}-triazolin-5-one and Bayleton symmetrical isomer.

Conclusion. This is a supplemental study for the proposed use.

3.6 Recovery of Bayleton and KWG 0519 from Soil and Water. Reports No. 51711 and 52593.

Using analytical method described in Report No. 51231 (See 3.1 of Discussion), recoveries in soil varied from 84-100% while recoveries in water varied from 96-102%.

Conclusion. These are supplementary studies.

3.7 The Metabolism of Triadimefon (HEB 6447) in Barley in the Greenhouse and in Soil - K. Vogeler. Report No. 49445. 7/16/76.

Soil metabolism studies were carried out on standard soil 1 (3.15%C, pH 6.6) under dark and light conditions at 22°C. CO_2 formation was investigated by storing soil for 120 days in darkness and trapping radioactive CO_2 IN NaOH.

Barley plants were sprayed at a rate of 250g a.i./ha and grown in a greenhouse (22°C, 70% RH). Sampling was done at intervals of 0 to 63. Barley kernels were treated at a rate of 2 ml of a 25% seed treatment per kg seed, planted in a greenhouse and sample at intervals between 3 and 99 days.

Soil and plant samples were extracted with acetone/ water and dichloromethane, eluted on a Florisil column and analyzed by TLC, GLC and LSS.

The major metabolite found in the soil metabolism studies was KWG 0519 (I and II). Estimated half-life of Triadimefon in soil is 2 weeks.

Table I. Percentage distribution of the ^{14}C-activity in soil after the addition of triadimefon

	Day	Extractable portion			Nonextractable portions
		KWG 0519 I	KWG 0519 II	Triadimefon	
a	14	3	36	47	7
	20	18	48	26	8
	62	17	54	14	15
	89	11	45	23	21
	108	16	59	9	16
b	14	5	22	64	9
	20	13	34	43	10
	62	16	55	12	17
	89	17	58	7	18

a = soil stored in darkness

b = soil stored in sunlight

In barley plants and seeds KWG 0519 (I and II) is the major metabolite. Triadimefon is rapidly degraded in barley plants with 10% of the ^{14}C-activity remaining after 5 days.

Conclusion. This is a supplementary study. Soil studies provide useful information in conjuction with others submitted by applicant.

3.8 The Aerobic and Anaerobic Soil Metabolism of Bayleton. R. R. Mango and R. J. Puhl. 1-12-77. Report No. 51230.

Bayleton-triazol-3, 5-^{14}C and ring-labeled Bayleton were incorporated into a silty clay loam (pH 5.9, org. matter-2.4%) at concentrations of 1 and 10 ppm. Soil was incubated under aerobic and anaerobic conditions. The anaerobic soils were flooded with distilled water, placed in a desiccator, and flushed with N_2.

An organic sandy loam (pH 7.4, org. matter-17.1%) was treated out doors with a 50% WP formulation of Bayleton-ring-UL-^{14}C at a rate of 1 lb a.i./A (incorporated to a depth of 6 inches - equivalent to 0.5 ppm). Additionally, soil samples were antoclaved for comparison with nonsterile soil studies.

Samples were taken at intervals from 0 to 238 days, extracted with methanol, acetonitrile and then chloroform and analyzed by LSS and TLC. Radioactive CO_2 was detected by NaOH traps.

The aerobic soil study showed that Bayleton-triazol-3, 5-^{14}C had a half-life of approx. 6 days on a silty clay loam. The major metabolite was the reduction product, KWG 0519 which reached a maximum level of 68% of applied ^{14}C in 71 days. The estimated half-life of KWG 0519 was 8-9 months.

Ring-labeled Bayleton evolved 24% of the applied ^{14}C as $^{14}CO_2$ after 238 days (as compared to 5%

12

for triazole labeled) the percentages of parent and major degradate (KWG 0519) were similar for both labeled chemicals at 238 days.

In the anaerobic soil study, Bayleton-triazole-3,5-^{14}C had a half-life of approximately 15 days with KGW 0519 as the major metabolite (75% of applied ^{14}C after 139 days).

The metabolites of Bayleton on sandy loam outdoors were similar to those found on silty clay loam in the laboratory; however, the rate of degradation was slower with t1/2 = 28 days. In the aerobic lab study with sandy loam soil, t1/2 = 18 days. This difference may be due to different pesticide incorporation procedures employed in the two studies.

In the sterile soil experiment, Bayleton was stable with no degradation found after 14 days.

Conclusion. These are acceptable aerobic and anaerobic soil metabolism studies.

I

% Distribution of Radiocarbon Following Aerobic Incubation of BAYLETON-^{14}C with a Silty Clay Loam Soil (1 ppm)

Sampling Interval (days)	Position of ^{14}C-Label	BAYLETON	KWY 0519	CO_2	Water Fraction	Unextracted*
3	Triazole	73.5	17.9	0.1	1.2	5.3
7	"	45.2	40.8	0.2	2.8	8.4
14	"	36.0	48.2	0.2	2.7	11.1
28	"	23.2	55.4	0.3	3.0	16.2
71	"	10.0	67.8	0.5	4.9	14.4
140	"	7.3	57.4	1.2	8.4	23.0
238	"	6.7	45.2	5.4	7.0	32.6
238	Ring	5.6	42.0	23.6	1.8	19.9

% Distribution of Radiocarbon Following Anaerobic Incubation of BAYLETON-triazole-3, 5-^{14}C with a Silty Clay Loam Soil (1 ppm)

Sampling Interval (days)	BAYLETON	KWG 0519	Water Fraction	Unextracted*
6	71.0	20.0	0.9	7.2
14	54.6	33.0	0.6	11.2
28	32.3	50.9	0.8	15.5
70	13.4	70.2	0.6	13.8
139	7.6	73.8	1.0	16.1
238	4.6	72.6	1.3	18.4

3.9 The Effect of Frozen Storage at 0 to -10° F on BAYLETON and KWG 0519 residues in loam soil. Report No. 52725.

Storing loam soil samples at 0 to -10° F had little effect on percent decomposition of Bayleton and KWG 0519.

Conclusion. This is a supplementary study.

3.10 Soil Thin-Layer Mobility of 24 Pesticide Chemicals. J. S. Thornton. Report No. 51016.

Twenty-four pesticides were spotted on thin-layer plates coated with non-absorptive sand to fine textured clay. The plates were developed with distilled water and the leaching behavior was determined by comparing Rf values. Leaching behavior was compared to a standard, Sencor which is moderately mobile. Bayleton was found to have low mobility.

Conclusion. This study in conjunction with the other leaching study (Report No. 51232) provides useful information.

3.11 Leaching Characteristics of Bayleton on Aged Soil J. J. Obrist, J. S. Thornton. Report No. 51232. 1/21/77.

Bayleton-Ring-UL-^{14}C (10 ppm) was incubated in sandy clay loam soil under greenhouse conditions (aerobic) for 30 days. Leaching was studied in a glass soil column (4.8 x 30 cm) which was eluted with 1/2 acre-inch of water per day for a period of 45 days. Leachate was collected daily and after 45 days the column was sectioned and analyzed by LSS.

Aged extracts were also examined by soil thin-layer chromatography using three different soil types.

The aged column leaching study and TLC study showed that Bayleton is mobile in a sandy clay loam and silty clay. After 45 days over 10% of ^{14}C activity could be found in the 17.5 - 22.5 cm soil section and 73% of the ^{14}C activity was below 5 cm.

Column Leaching of BAYLETON-ring-UL-^{14}C Aged in Sandy Clay Loam Soil *

Soil Depth, cm	% Activity Found
0 - 1.25	11.2
1.25 - 2.50	4.8
2.50 - 5.0	11.2
5.0 - 7.5	10.4
7.5 - 12.5	23.2
12.5 - 17.5	19.9
17.5 - 22.5	11.5
22.5 - 27.5	4.5
27.5 - 30.0	0.5
Leachate	2.8
Total	100.0

* Sectional glass column 4.8 cm diameter x 30 cm long packed with untreated sandy clay loam soil overlayed with 10 gms of soil containing 30-day aged residues of BAYLETON-ring-UL-^{14}C and leached with 1.25 cm of water daily for 45 days.

Soil TLC Leaching of BAYLETON-ring-UL-^{14}C Aged Soil Extracts on Three Soils

Soil Strip Distance (cm) (origin to 10 cm)	% Activity Distribution* Silty Clay	Agric. Sand	Silt Loam
-0.5 - 1.0	4.0	11.5	13.0
1.0 - 2.5	10.5	35.8	23.4
2.5 - 4.0	30.9	35.2	33.1
4.0 - 5.5	46.9	13.5	23.7
5.5 - 7.0	4.8	1.6	2.8
7.0 - 8.5	0.7	0.4	1.0
8.5 - 10.0	2.2	2.0	3.0
Total	100.0	100.0	100.0

Conclusion. This is an acceptable aged leaching study. The results of the Boyleton is significantly more mobile than the results found in Report No. 51016. Aging may increase the mobility of Bayleton in soil or different labels may have been used in these studies. Applicant should account for these differences. A soil column leaching study without aging would provide useful data.

3.12 Soil Persistence. K. A. Noegel, L. J. Rains, H. E. Click, J. W. Warren. Reports No. 51691, 51692, 52763, 52704, 52765, 52766, 52905, 52906.

Eight different soil types ranging from a sand to a clay were sprayed with a 50% WP formulation at 20 lbs/A followed by incorporation into a six inch depth (This rate is equivalent to 10 ppm in soil). Soil samples taken from the 0 - 6" and 6 - 12" depths were analyzed at 0, 34, 92, 153, 183, 262, and 273 days.

The amount of Bayleton remaining in the 0 - 6" depth after 262 - 273 days varied from 1-17% of applied ^{14}C activity with the highest amount found in sand. Bayleton residues in the 6 - 12" depth did not exceed 0.14 ppm.

Decline in levels of parent compound were largely offset by buildup of levels of Metabolite A(KWG 0519) in most cases.

Metabolite A was found at levels as high as 15.3 ppm in the 0 - 6" depth and 3.88 ppm in the 6 - 12" depth. The combined data shows an average half-life of 5 days for Bayleton alone. However, residues of Bayleton plus Metabolite A have an average half-life of 225 days.

Conclusion. These studies constitute an acceptable field dissipation study. Since the reduced product (KWG 0519) is more persistent in the environment than parent compound, the breakdown of this metabolite and uptake in rotational crops, etc. should be examined for other uses.

Soil Type	Location		Gross Residue (PPM) 0-6" Depth BAYLETON	0-6" Depth METABOLITE A	6-12" Depth BAYLETON	6-12" Depth METABOLITE
Loamy Sand	Howe, IN	0	21.2	0.01	2.52	0.01
		34	1.82	8.29	0.12	0.62
		92	0.01	0.01	0.01	0.01
		273	0.21	2.89	0.05	1.30
Sandy Loam	Howe, IN	0	16.9	0.01	1.46	0.01
		34	5.00	16.0	0.61	2.09
		92	0.01	0.01	0.01	0.01
		273	0.49	4.64	0.07	1.18
Sand	Vero Beach, FL	0	17.3	0.01	0.24	0.01
		30	1.22	6.18	0.01	0.02
		92	1.42	8.58	0.08	0.80
		153	3.84	7.29	0.11	2.43
		183	4.00	0.31	0.09	0.30
		273	3.03	1.80	0.11	0.92
Silt Loam	Vero Beach, FL	0	11.9	0.01	0.16	0.01
		30	6.28	10.7	0.13	0.86
		92	0.56	3.28	0.04	0.38
		153	1.90	4.79	0.83	0995
		183	1.65	4.60	0.19	0.64
		273	1.26	2.78	0.07	0.26
Loam	Rivergrove, OR	0	6.73	1.69	0.16	0.04
		34	1.04	6.73	0.79	2.82
		91	1.27	15.1	0.19	1.60
		262	0.61	15.3	0.14	2.88
Silt Loam	Vancouver, WA	0	11.2	0.01	0.47	0.01
		36	1.01	6.79	0.25	1.53
		91	0.69	13.3	0.25	3.35
		263	0.70	13.2	0.11	3.43
Silty Clay Loam	Stanley, KS	0	Lost	Lost	Lost	Lost
		30	0.86	12.4	0.06	0.41
		92	0.35	16.6	0.14	0.85
		273	0.06	4.23	0.03	0.26
Clay	Stanley, KS	0	Lost	Lost	Lost	Lost
		30	1.47	11.0	0.14	0.52
		92	0.61	10.5	0.10	0.47
		273	0.20	3.36	0.06	0.69

3.13 Effect of Bayleton on Isolated Soil Microorganisms R. G. Minor. 12/3/76. Report No. 50967.

Nine microorganisms (Bacillus subtilis, Cellulomonas biazotea, Pseudomonas aetuginosa, Pseudomonas maltophilia, Streptomyces scabies, Aspergillus nigers, Penicillium daleae, Trichodemma vixide, and Phycomyces nitens) were incubated on nutrient agar (bacteria and actinomycetes) or potato dextrose agar (fungi) which contained 0, 10, 100, 1000, and 10,000 ppm Bayleton. Diameter of zones of inhibition were measured and compared to control plates.

Only one bacterium (Ps. maltophilia) and one fungus (Phycomyces nitens) showed inhibition at expected environmental concentrations of Bayleton. Other organisms did not show inhibition until 100 - 10,000 ppm Bayleton.

Conclusion. This study shows little inhibition to microorganisms. We would prefer that the applicant quantitate numbers of organisms by standard plate counting, etc. Rather than by measuring zones of inhibition.

3.14 Effects of Bayleton on Nitrification and Denitrification in Soil. K. J. Strankowski. Effects of Bayleton on Nitrogen Fixation. R. G. Minor. Report Nos. 50968 and 51104.

For nitrification and denifrification experiments 0.5 and 5.0 ppm Bayleton 50 WP was added to a sandy clay loam containing either ammonuim sulfate or calcium nitrate. Nitrification samples were incubated at 30°C and 90% RH for 14 ar 28 days. Demtrification samples were flooded and placed in an anaerobic chamber under CO_2 + H_2 atmosphere for 3, 7 and 14 days. Duplicate samples of control and heated soils were analyzed by Bremmer's steam distillation method for ammonium-nitrogen and (nitrite)-nitrogen. Demitrification and nitrification were reported as not being effected by Bayleton at 0.5 ppm and 5 ppm.

2

Nitrogen fixation was studied on soybean nodules irrigated for 4 weeks with a nitrogen deficient nutrient solution containing 0.5 ppm Bayleton. The plants exhibited a 50% decrease in shoot length, 21% decrease in plant fresh weight and 29% decrease in nodule fresh weight as compared to controls but nitrogen-fixing ability (measured by acetylene reduction on gle) was not effected.

Conclusion. The nitrogen fixation study is not acceptable since studies must be performed with free-living organisms not symbiotic ones. Efficacy should examine this study for phytotoxicity. When the microbial functional approach is chosen, data on the effects of pesticide on degration of cellulose, starch and protein must also be examined. In the nitrification and denitrification experiments, the applicant should submit the raw data or results from the microbial experiments in addition to the conclusions.

3.15 Accumulation and Persistence of residues in Channel Catfish Exposed to Bayleton-^{14}C. D. W. Lamb. Report No. 52775. 5/4/77.

Channel catfish were continuously exposed to Bayleton-^{14}C (ring-labeled) for a 28-day period at concentrations of approximately 10 ppb and 100 ppb. Whole catfish and water samples were assayed radiometrically throughout the 28-day exposure and 28-day withdrawal periods. Fish were also sectioned into edible and non-edible portions, extracted by acetonitrite and hexane, and assayed by LSS.

Water samples varied from 9.5 - 10.8 ppb and from 97 - 116 ppb in the two experiments. Catfish showed accumulation factors of approximately 7.6 from the 10 ppb experiment and 6.5 from the 100 ppb experiment during the exposure period. The non-edible portions of the catfish contained 74 - 84% of the extractable ^{14}C residues. During the withdrawal period, approximately 83% of the accumulated ^{14}C residues were excreted by the fish within 5 hours and approximately 96% were eliminated within 7-10 days.

3

Carbon-^{14} Residues in Whole Bodies of Channel Catfish During a 28-Day Continuous Exposure to BAYLETON-^{14}C At a Concentration of 10 ppb

Day of Exposure	Weight (g)	Radioactivity (dpm/g)	Residues (ppb)	Average Residues (ppb)	Accumulation* Factor
0 (1 hour)	1.892	1747	37	28	2.8
	2.385	988	19		
0 (2 hour)	1.511	2247	50	54	5.4
	2.154	2583	58		
0 (6 hour)	1.604	2012	47	41	4.1
	1.680	1494	35		
1	1.673	2414	55	50	5.0
	1.987	2006	45		
4	1.452	1535	36	39	3.9
	11.718	1857	43		
7	[illegible]	1619	44		
7	0.950	1619	35	39	3.9
10	1.240	2000	44		
10	1.345	3787	83	76	7.6
	1.680	3202	70		
14	1.443	2119	43	47	4.7
	2.091	2492	51		
21	1.245	1330	27	38	3.8
	1.158	2441	50		
28	0.842	1815	38	32	3.2
	1.233	1273	27		

Carbon-14 Residues in Whole Bodies of Channel Catfish During a 28-Day Continuous Exposure to BATLETON-^{14}C At a Concentration of 100 ppb

Day of Exposure	Weight (g)	Radioactivity (dpm/g)	Residues (ppb)	Average Residues (ppb)	Accumulation* Factor
0 (1 hour)	1.629	1715	369	306	3.1
	1.702	1132	243		
0 (2 hour)	1.071	2322	527	342	3.4
	1.311	688	156		
0 (6 hour)	1.483	1407	304	629	6.3
	1.676	4418	955		
1	1.518	1640	340	547	5.5
	1.845	3638	754		
4	2.233	2935	615	605	6.1
	2.702	2838	595		
7	1.169	2571	492	345	3.5
	1.447	1036	198		
10	0.940	1955	392	423	4.2
	1.230	2260	453		
14	1.682	2435	463	380	3.8
	1.305	1563	297		
21	1.053	1665	317	316	3.2
	1.498	1650	314		
28	1.606	4452	923	651	6.5
	0.927	1822	378		

Conclusion. Two exposure systems are required: flow through using bluegill sunfish and static using channel catfish (the applicant chose to use a flow-through system with catfish). For the static system a sandy loam soil is treated with pesticide at use rate, aged under aerobic conditions for 2-4 weeks prior to initiation of fish exposure. In addition the applicant should identify residues in water, soil whole body fish, edible tissue, and viscera at each sampling interval. Subsequent experiments should be run with concentrations closer to use rate (1 and 5 ppm). experiments should

4.0 Conclusions

Bayleton was stable to hydrolysis at pH 3, 6, 9 and 25°, 35° and 45°C. Photolysis half-life of Bayleton in aqueous solution was 10-12 hours with 1,2,4-triazole being the major photoproduct from triazole-labeled Bayleton and CO_2 and an unidentified polymer being the major photoproduct from ring-labeled Bayleton.

Bayleton-triazol-3,5-^{14}C had a half-life of 6 days under aerobic conditions and 15 days under anaerobic conditions in laboratory experiments. Sterile soil experiments showed no degradation of Bayleton (microbial metabolism is most likely a major route of degradation in soil and water).

In field dissipation studies Bayleton had an average half-life of 5 days while Bayleton plus the reduced degradate KWG 0519 had a half-life of 225 days. (In this case the degradate appears to be more persistent in the environment than parent compound and should be examined in subsequent studies such as rotational crops, fish accumulation).

Bayleton leaches moderately fast in soils. It does not pose a significant hazard to microorganisms or to channel catfish at low levels (100 ppb).

5.0 Recommendations

5.1 We do not have adequate data to assess hazards to the environment for the use of Technical Bayleton. The applicant must submit an activated sludge study if discharge into a waste water treatment system occurs. The following protocol is suggested:

Activated Sludge Metabolism

Pesticides discharged into wastewater treatment systems may be transformed or disrupt the treatment process. A study of effects of pesticides on the wastewater treatment process is required. Synthetic sewage (nutrients) and radioisotope material are added to activated sludge and aerated in a closed system for 23 hours; the sludge is allowed to settle for 30 minutes. A liter of supernatant (effluent) is removed for pesticide residue analysis including a material balance. Fresh synthetic sewage and test compound are added to the remaining sludge and the cycle including fresh synthetic sewage and test compound, is repeated. Dosage should start at 0.1 ppm and increase by increments to 100 ppm. Effects on microbial population must be determined by daily total counts of viable organisms in sludge.

5.2 We do have adequate data to support the use of 25% WP and 50% WP formulations of Bayleton on azaleas. Acceptable studies include hydrolysis, photolysis, aerobic and anaerobic soil metabolism and soil field dissipation. These studies may be deficient for major uses.

5.3 Other studies may be required depending upon proposed use.

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5/22/78