11/7/75
3125-GNA

EEB BRANCH REVIEW

DATE: IN ____ OUT ____ IN 6/4/75 OUT 8/13/75 IN ____ OUT ____

FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. 3125-GNA

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. ____

PRODUCT NAME(S) Baygon MOS Insecticide

COMPANY NAME Mobay Chemical Corporation, Chemagro Agricultural Division

SUBMISSION PURPOSE Registration

CHEMICAL & FORMULATION O-Isopropoxyphenyl Methylcarbamate

BEST AVAILABLE COPY

1.0 Recommendations:

1.1 No registration:

1.2 Several data deficiencies noted in our previous review have not been resolved in the data submitted. Answers to the following questions should be submitted:

1. How much is bound in soil?

2. What is the half-life of Baggon?

3. What is the time when only 10% of total residues remain?

4. What are the soil degradation products?

5. If crop uses are proposed, will residues be taken up in rotational crops?

6. Will residues accumulate in fish? Studies of the following type should be submitted. See enclosure. (Send out second draft guidelines V-37 & V-38)

1.3 The following comments are made on the data submitted:

1. Study 30533. What is the depth of the soil s4mples taken? Data on sample storage and stability are needed. Data on the analysis of control samples stored under similar conditions is needed.

2. Studies 30958, 30960, 30961. What is the depth of the soil samples taken?

3. Study 30589. More complete experimental data are needed such as the amount of Baggon applied to the column, amount of water applied, activity found in effeunt and column segments etc. A leaching study on degradation products will also be needed. See enclosure. (see out second draft guidelines V-32)

4. Study 30589. Statement on page 15 that 5 grams of soil were used per test does not appear to agree with statements on page 22,23 and 24 that only one gram was used. This should be explained.

5. Additional photodegradation studies will be needed in water and on soil surfaces. The studies as carried in less than one day are inadequate to assess photodegradation. See enclosure. (Send out second draft guidelines V-40, V-41, V-43, V-44)

2.0 Indroduction:

2.1 Other names: Baygon , aprocarb, propoxur. 2-(1-methylethoxy) phenol methylcarbamate.

2.2 Physical and chemical properties: See previous review dated 6/6/74

2.3 Percent active: 12.8%

2.4 Uses involved: Control of adult mosquitoes in urban, open field and wooded areas. Specification of rotes for Florida only.

2.5 Other environmental chemistry reviews: See review dated 6/6/74.

3.0 Direction for Use:

3.1 Non-thermal ULV aerosol ground application: Apply undiluted using 1-1/4 to 8 fliud ounces per acre or 3 to 18 pints per mile of front covering a swath 300 feet wide (36.4 acres). Rates less than 2 flaid ounces per acre or 4-1/2 pints per mile front may be used in Floride only. Use equipment specifically designed for ULV application of non-thermal aerosols (cold fogging). Repeat as necessary to maintain adequate control.

Ultra-low volume (ULV) aerial application: Apply 4 to 16 fluid ounces per acre with suitable aircraft equipment. For lower dosages dilute with sufficient oil to obtain total volume of 16 fluid ounces (1 pint) per acre.ddDosages of 12 to 16 fluid ounces per acre all are mally recommended for areas with dense vegetation. Repeat as necessary to maintain adequate control.

Do not use water for dilution. Apply either undiluted using ULV equipment or dilute with oil carriers such as No. 2 fuel oil (diesel) or Kerosene.

Baygon MOS Insecticide contains 1 lb ai/gallon.

4.0 Discussion of data:

4.1 Analytical methods:

4.1.1 A Gas Chromotographic Method for the Determination of Baygon in Soils: (30447)

An analytical method for Baygon in clay or silt loam soil was developed. The method involves inited extraction with a chloroform-methanol-water mixture, a Florisil column chromatography cleanup step, derivitization with trichloroacetyl chloride and quantitation by gas chromatography using an electron capture gas detector. Confirmation was by injection onto a second column prepared with a different packing.

Typical recoveries are given as 104% for clay fortified at 0.05 P.P.M. and 96% for silt loam fortified at 0.08P.P.M.

Conclusions:

(1) Method does not determine degradation products.

4.1.2 Gas Chromatographic method for the Determination of Residues of Baygon and Its Metobolites in Plants: (30045)

Baygon and metabolite glycosides are separated frompplant material by extraction with acetone and chloroform. Baygon is separated from water-soluble glycosides by a partition between chloroform and water.

After additional solvent partition and column cleanup, Baygon is hydrolyzed and derivatized with trichloroacetyl chloride. After final cleanup on a silica gel column, Baygon is quantitated by gas chromatographic analysis using an electron capture detector. Sensitivity of less than 0.05 ppm is claimed.

Water soluble metabolites are subjected to engyme hydrolysis, solvent partition, column cleanup, derivatization with trichloroacetyl chloride and are quantitated by gas chromotagraphic analysis using electron capture detector. The o-hydroxy and N-methoxy metabolites are determined by this method at sensitivities of less than 0.10 ppm and 0.05 ppm respectively.

4.1.3 Recovery of Baygon from Soil: (30445)

Data are submitted on recoveries of Baygon from clay and silt loam soil.

Analytical Method 30447

Recovery from clay about 102 to 107% and from silt loam soil 92-96%.

4.1.4 Recovery of Baygon from soil-Confirmatory Column (30446)

Analytical Method 30447

Recovery from clay 93.4 to 108.5% and silt loam 90.2 to 108.5%.

Conclusions : (30445-30446)

(1) Data indicate that the method may be questionable at least for clay soils. Unfortified sample gave peak area of 3.09 sq. in. while 0.1 ppm std. gave area of 0.85 sq. in (30445)

4.2 Degradation + Persistence Studies:

4.2.1 Soil dissipation studies (30534)

A liquid formulation of Baygon (1.5 lb/gal.) was broadcast onto clay and silt loam plots in Stanley, Kansas, and rototilled into soil to a depth of 4 to 6 inches. Nominal application rate was 10.0 ppm based on assumption of 2×10^6 pounds of soil/acre (six inches deep). All samples were applied on 6/4/68. Total rainfall over the test period was 36.61 inches. Analysis was by method 30447.

Application To Sampling (days)	Analysis Date	Peak Area (sq. in.) Sample	Peak Area (sq. in.) 0.1 ppm Standard	Control P.P.M.	Net Residue P.P.M.
Clay (control)	5/26/71	0.66	0.85	0.08	
1	5/27/71	72.0	0.80		8.92
35	6/10/71	58.4	0.88		6.56
93	6/10/71	0.53	0.88		<0.08
184	6/10/71	0.51	0.98		<0.08
372	6/10/71	0.40	0.86		<0.08
Silt Loam (control)	5/26/71	0.38	0.85	0.04	
1	5/27/71	60.0	0.80		7.46
35	6/01/71	47.0	0.80		5.82
94	6/01/71	8.10	0.83		0.93
184	6/02/71	1.13	0.98		0.08
372	6/02/71	1.62	0.90		0.14

5

4.2.2 Soil Dissipation Studies: (30533)

A 5% granular formulation of Baygon was broadcast onto clay and silt loam plots in Stanley, Kansas, and rototilled into soil to a depth of 4 to 6 inches. Samples were taken to 372 days and analyzed for Baygon. Nominal application rate was 10.0 ppm based on assumption of 2 x 10^6 pounds of soil/acre (six inches deep). All samples were applied on 6/4/68. Total rainfall over the test period was 36.61 inches. Analysis was by method 30447.

Days Applic To Sampling	Analysis Date	Peak Area (sq. in.) Sample	Peak Area (sq. in.) 0.1 ppm Standard	Control P.P.M.	Net Residue P.P.M.
Clay (control)	5/26/71	[illegible]	[illegible]	[illegible]	
1	5/27/71	93.0	0.83		11.12
35	6/08/71	42.88	0.69		6.13
93	6/08/71	0.35	0.69		<0.08
184	6/08/71	0.22	0.66		<0.08
372	6/08/71	0.33	0.66		<0.09
Silt Loam (control)	5/26/71	0.38	0.85	0.04	
1	5/27/71	90.0	0.83		10.79
35	6/01/71	48.0	0.86		5.54
94	6/01/71	8.2	0186		0.92
184	6/02/71	0.88	0.83		0.07
372	6/02/71	1.38	0.95		0.11

Conclusions:

(1) The reliability of method 30447 is questionable at least for clay soils.

(2) Depth of soil samples taken is not given. Dissipation may be due to leaching beyond sampling zone.

(3) No analysés were made for degradation products.

(4) Analyses were made approximately 2 years after sampling. We need data on sample history and analysis of control samples stroed under similar conditions.

4.2.3 Soil Persistence Study (Sandy Loam) 30958:

A 15% granular formulation of Baygon was broadcast and incorporated to a depth of 4-6 inches in a sandy loam. Soil characteristics were: Sand 49%, Silt 30%, Clay 21%. Organic matter 9.0%, PH 6.2, CEc 11meg/100gm., Field moisture Capacity 44%. Rainfall was 10.42 inches over the test period of 92 days. Analysis was for parent Baygon only by method 30447. Residues found were 16.81 ppm at 0 days, 11.43 ppm at 31 days and 2.15 ppm at 92 days.

4.2.4 Soil Persistence Study: (Silt Loam) 30960

A 70% W.P. formulation of Baygon was spray breadcast and incorporated to a depth of 4-6 inches is a silt loam. Soil characteristics were: Sand 31%, Silt 41%, Clay 27%. Organic matter 3.7%, PH 7.0, CEC 15 meg/100gm., Field moisture capacity 41%. Rainfall was 13.93 inches over the test period of 92 days. Analysis was for parent Baygon o only by method 30447. Residues found were 17.56 ppm at 0 days. 13.28% at 31 days and 1.08 ppm at 92 days.

4.2.5 Soil persistence, Study: (Silt Loam) 30961

A 15% granular formulation of Baygon was broadcast and incorporated to a depth of 4-6 inches in a silt loam. Soil characteristics were: Sand 31%, Silt 41%, Clay 27%, Organic matter 3.7%, PH 7.0, CEC 15 meg-100 grams, Field moisture capacity 41%. Rainfall was 13.93 inches over the test period of 92 days. Analysis was for parent Baygon only by method 30447. Residues found were 16.88 ppm at 0 days, 14.91 ppm at 31 days and 2.68 ppm at 92 days.

Conclusions:

(1) For studies 30958, 30960 and 30961 the experimental data are not complete. Sample depth is not given. Analyses are for parent Baygon only.

4.2.6 Recovery of Baygon From Soils: (30794)

The recovery of Baygon from sandy loam and silt loam soil at 0.5 and 1.0 ppm was studied. The analytical method described in report no. 30447 was used. The pesticide in acetone was added to blinder jar. Recoveries in four tests ranged from 88 to 117 per cent.

Conclusions:

(1) Recoveries may not apply to pesticide aged in soil. Data indicate that extraction may have begun soon after fortification.

4.2.7 A note on the sorption of insecticides on tropical soils (13883):

Baygon is said to have a half-life of 21 to 33 days or longer on certain tropical soils (characteristics not given). Bioassays indicate that sorbed carbamotes are biologically active. No data are given.

4.3 Hydrolysis:

4.3.1 Hydrolysis and Water Stability Studies: (30589)

The stability and behavior of Baygon in three water systems was studied. In the first test Baygon at about 10 ppm was introduced into a plastic outdoor pool containing two inches of bottom silt and ten inches of water taken from a lake. The pool was protected from mainfall but otherwise exposed to air and light. The temperature range was 27-36°C with water PH 7. Half life of parent compound is reported as 12.7 hours.

In a second system, Baygon (14C/3H) at about 20 ppm was introduced into vessels of lake water and silt nearly air-tight with quartz covers, held outdoors. One of the vessels was sterilized after assembly in a steam autoclave. Temperature range was 5-22°C and water PH of 7 in both cases. Half-life of parent compound in the sterile system was 80.8 hours and 54.9 in the non sterile system.

A third system consisted of phospate buffers of PH 5, 7 and 9 treated with Baygon (14C/3H) at 10 ppm and maintained in capped, amber bottles in constant temperature water baths at 30 and 50°C in the dark. Samples were taken for Baygon. Half-lives of parent compound at 30°C were: No measureable change after 31 days at PH 5, 725 hours at PH 7 and 1.2 h hours at PH 9. At 50°C half-lives were: 1655 hours at PH5, 23.0 hours at PH 7 and 0.1 hours at PH 9. O-isoprapoxy phenol was indentified as a major hydrolysis product by GLC at PH 9.

Conclusions:

(1) The hydrolysis of Baggon is PH and temperature dependent.

(2) Microbial action and photolysis both appear to participate in the degradation of Baygon in aqueous media.

(3) O-isopropoxy phenol is identified as a major hydrolysis product.

4.3.2 Studies on the persistence of some carbomate insecticides in the aquatic environment: (34648)

The hydrolysis of Baygon and other carbomate pesticides was studied in buffered alkoline solutions. Progress of the hydrolysis was followed by U.V. spectrophotometry by measuring the increase in absorption at 280 nm. The half-life of Baygon is 16 days at PH 8, 1.6 days at PH 9 and 0.17 days at PH 10. The temperature coefficients for the hydrolysis of these compounds lie in the range of 2.0-2.9. The hydrolysis rate is therefore temperature dependent and will increase 2-3 times for each 10°C rise.

Conclusions:

(1) The hydrolysis of Baygon is dependent on both PH and temperature. Hydrolysis rate increasing markedly with increased PH and temperature.

(2) Hydrolysis of carbomate esters generally proceeds with the formation of a hydroxy compound, an amine, and carbon dioxide.

4.3.3 Persistence of Pesticides in River Water: (30592)

The persistence of 28 pesticides including Baygon was studied in raw river water over an eight week period at a concentration of 0.01 ppm. Baygon was 50% hydrolyzed to its coresponding phenol after two weeks, and 95% hydrolyzed after 8 weeks. No phenol was found, in the water after 8 weeks. Water PH varied from 7.3 to 8.0 during the test, which was carried out in sealed jars in sunlight or fluorescent light.

Conclusions:

(1) Baygon degraded almost completely in the raw river water under test conditions with half-life of about 2 weeks. The precise mode of breakdown whether hydrolytic, microbiol vs photolytic is not elucidated.

4.4 Photodegradation:

4.4.1 Sensitized photodecomposition and photosensitizer activity of pesticide chemicals exposed to sunlight on silica gel chromatoplates. (41946). Baygon was one of 23 radiolabeled pesticides exposed to sunlight for 1 hour on silica gel plates with 28 known photosensitizers including anthroquinone, acetophonone and anthracene. After exposure, plates were developed with ether-hexane (3:2) and analyzed by radioautography. No photosensitizing activity was shown against Baygon by any of the 28 sensitizing agents.

Conclusions:

(1) None of 28 photosensitizing agents effected the photodegradation of Baygon under conditions of the experiments.

(2) 4.4.2 The photodecomposition of carbamate insecticides (16458):

Baygon, along with other carbamate insecticides, in absolute ethanol or hexane was subjected to irradiation from U.V. sources or sunlight for 1 to 3 hours. The U.V. sources produced peak radiation at about 254 nm. Aliquots of irradiated or reference solutions were applied to TLC plates and developed with suitable solvent. Baygon did not photodegrade under sunlight exposure and was only slightly effected by U.V. irrodiation.

Conclusions:

(1) Baygon did not photodegrade under sunlight and showed slight degradation under U.V. irrodiation with peak wavelength at 254 nm. under conditions of the experiments.

(2) Results of studies on the photodegradation of Baygon in water and on soil will be needed.

4.5 Degradation by Microbes:

4.5.1 Degradation by soil micro-organisms: (33364)

Baygon was tested with several soil micro-organisms using dextrose broth, nutrient broth, a water-soil mixture, and moist soil as substrates. Insecticide residues were determined indirectly by measuring the inhibition of acetylcholinesterase. Beef brain homogenates were used as the source of acetylcholinesterase and the activity was measured colorimetrically. Soil micro-organisms substantially reduced the toxicity of cholinesterase inhibiting Baygon. Pure cultures of Aspergillus, Serratia and Pseudomonas species were the most active. All tests were run in a growth chamber at a temperature of 30°C with a twelve-hour photoperiod.

Conclusions:

(1) Several soil micro-organisms were found to be active in reducing Baygon toxicity based on the utilization of acetylcholinesterase inhibition as an assay method.

4.5.2 The Fate of Baygon in Soil: (30590)

Three soil types (sandy loam, silt loam, and high organic silt loam) were fortified with 250 ppm of Baygon and kept at approximately 15% moisture in constant humidity chambers for up to 116 days. At the termination of the test, 88.9 to 98.7% of the applied material was organosoluble and found to be parent Baygon by TLC.

A sample of silt loam soil was suspended in 75 ml. of sterile soline solution. Five ml. aliquots of supernatant were transferred to each of three flasks A, B and C. All were fortified with labeled Baygon at 2.5 ppm. Flash B was treated with 0.5g of D-Glucose. Flask C was boiled for 20 minutes before Baygon was added. Flasks were stoppered with sterile cotton, placed in a reciprocating shaker both at 30°C and agitated for up to 21 days. Apparent Baygon concentration changed little for nine days. Thereafter, flask A showed the greatest decline in applied Baygon to 52-59% of the original dosage VS 88 to 94% for the sterile control, Flask C. Decline in flask B was intermediate.

Five grams each of sandy loam, silt loam and high organic silt loam previously fortified with unlabeled Baygon (250 ppm) were suspended in 15 ml of sterile water. A sample of unfortified silt loam soil was treated similarly. Aliquots of the water supernatant were cultured on nutrient agar plates incubated at 30°C for 24 hours and sub-cultured into 10 ml of nutrient broth diluted to 1 mg/mℓ. Flasks were treated with 10 ppm 3H/14C Baygon and maintained under a variety of conditions: (dark, anaerobic, sterile, etc.). After 4 days, recoveries of 14C and 3H activity indicated a marked decline in Baygon content for all samples except a sterile sample and one tested under anaerobic conditions. Activity in these samples remained unchanged.

Conclusions:

(1) Soil microorganisms appear to participate in the breakdown of Baygon. However, the stability to metabolism shown in the first series of tests indicates that concentration or other factors may influence microbial breakdown.

4.6 Effects on Microbes:

4.6.1 Effect of Baygon on Microbial Populations: (36131)

Indiana clay loam and Commerce silt loam soils were treated with 50 and 250 mg/kg Baygon and maintained at 60% field capacity for 56 days. Samples were taken at intervals and assayed for populations of bacteria, fungi and actinomycetes by placing suitable dilutions of soil solutions on specific media. Inoculated plates were incubated for two to seven days at 28°C and the number of colonies per plate determined. No sugnificant difference in population between control and treated samples were found for either soil type.

Conclusions:

(1) Baygon had minimal effect on soil microorganisms under the conditions of the experiment.

4.7 Mobility Studies:

4.7.1 Leaching Experiments: (30589)

Baygon was applied to soturated leaching columns 45cm in length + 1.6cm diameter. The soils used are identified under "Adsorption experiments." The dosage rate of carbon-14 and trituim labeled Baygon is given as 10 ppm but this is not fully explained. One void volume of tap water was added to the top of the columns and allowed to percolate through the soil until no more flow was observed. Ratios of 3H/14C were calculated in order to estimate possible degradation. No significant degradation was indicated using this method. After leaching columns were segmented and analyzed for radioactivity by LSC. The report states that the 'radioactivity traveled near the edge of the water!'

Conclusions:

(1) It appears that Baygon leaches readily in the soils tested. However, very little actual experimental data are given.

(2) More complete experimental data are needed such as: amount of Baygon applied to the column, amount of water applied, activity found in effluent and column segments etc.

(3) A leaching study on degradation products will be needed.

12

4.7.2 Runoff Experiments: (00589)

Field runoff studies were conducted on three soil types (see Adsorption experiments for [illegible]) Baygon was applied at the rate of 3.61 lbs. AI/acre. Plots were inclined approximately one inch per foot. Pesticide was applied to the upper 10 feet while downslope untreated areas were [illegible] 20 feet in length. Runoff water was collected in troughs leading to recessed buchets. Watering was by irrigation. At day 35, six inch depth soil samples were taken and analyzed for Baygon only. Percent of applied Baygon found was 14.15% for sandy loam, 12.07% for silty clay loam and 32.89% for high organic silty clay loam. Data repeesenting total recoveries of Baygon residues in runoff water and soil on day 47 are given below:

Soil Type and Lane		Inches Of Irrigation	% of Applied BAYGON Recovered Runoff Water	Soil*	Total
Sandy Loam	5'	5.20	8.62	10.73	19.35
	10'	to	10.55	11.25	21.80
	20'	5.80	13.30	12.84	26.14
Silty Caly Loam	5'	4.50	15.25	5.63	20.88
	10'	to	14.82	6.99	21.81
	20'	5.25	17.91	3.76	21.67
High Organic Silty Clay Loam	55'	3.78	9.20	27.73	36.93
	10'	to	12.65	26.75	39.40
	20'	4.45	18.35	26.96	45.31

*Corrected to day 47

<u>Note</u>: Recovery values are for parent compound only. Analyses for metabolites was not successful.

Conclusions:

(1) Baygon may be expected to move laterally in the environment thru runoff.

(2) The runoff angle (less than 5°) is relatively small. Runoff rates given by the data should be considered as minimal indications of what might occur in terrain that is not flat.

(3) There were no analysès for degradation products or metabolites. Theee might be quite significant in runoff water as indicated by the low total recoveries reported (19-45%).

4.7.3 The Mobility and persistence of Baygon in soil and water: (30589)

Adsorption Experiments: (30589) The adsorptivity of Baygon for three soil types was determined - Soil Characteristics are given below:

Texture	% Sand	% Silt	% Clay	% Organic Matter	PH	Bulk Density
Loam	40	42	18	1.4	7.7	1.43
Silty Clay Loam	8	54	38	2.0	6.3	1.28
Silty Clay Loam	6	54	40	4.4	6.1	1.35

Ten ml. of aqueous 14C labeled (carbonyl) Baygon solution containing 0.065 to 1.044 ppm Baygon were equilibrated with 5 gram of soil by mechanical agitation. The equilibrium concentrations of Baygon found in water VS soil were plotted. The slope of the resulting adsorption isotherm is measured yielding the adsorption coefficient. The coefficients ([illegible]) found are given as 0.62 for sandy loam, 0.49 for silty clay loam and 1.12 for high organic silty clay loam.

__Note:__ Statement on page 15 that 5 grams of soil were used per test does not agree with statements on pages 22, 23, and 24 that only 1 gram was used.

__Conclusions:__

(1) Baygon does not appear to be strongly adsorbed to the soils tested.

(2) The apparent discrepancy in the data concerning the amount of soil used per test should be explained.

4.8 Plant Metabolism:

4.8.1 Plant Metabolism of Baygon: (21746)

Carbonyl and isopropoxy labeled Baygon were applied to leaf surfaces of actively growing plants (beans & corn). Losses of activity from leaf surfaces ranged from 67%-78% at 5 days. Up to 30% of remaining activity was not removeable from the plant surface. The beta-glucosides of o-hydroxyphenyl N-hydroxymethylcarbamate (I) and o-isopropoxyphenyl N-hydroxymethylcarbamate (II) were found to be metabolites by enzymatic hydrolysis. Downward translocation from leaves to root was not indicated.

Radiolabeled Baygon (carbonyl + isopropoxy) in tap water was applied to the roots of growing corn plants. There was a continuous increase in the concentration of metabolites on the leaf surface and in the water extractable fractions of the plants. The beta-glucosides of I and II were tentatively identified by co-chromatography with known standards.

Conclusions:

(1) Baygon in water solution is taken up from roots to leaves of corn plants.

(2) Two conjugates of hydroxy mebatolites I and II have been identified in the corn plant.

(3) Downward movement of topically applied radiolabeled Baygon from leaves to roots is not significant.

4.8.2 Metabolism of Baygon in Corn Plants: (29233)

Eighteen corn plants were placed in a wide mouth brown glass bottle containing 540 ml. of aqueous Baygon solution at a concentration of 15 microgram per milliliter containing both carbonyl 14C and isopropoxy 3H labels. The 3H/14C ratio was 17.5. The jar was closed with masking tape allowing only sufficient room for the stems. Plants were placed under fluorescent lamp operated on a 12 hour light/dark cycle. After 14 days, the corn plants were cut into small pieces, ground and extracted to give an organic fraction, an extracted water fraction, a solids fraction and a root water fraction. About 45% of applied activity was found to be Baygon in the organic fraction; 9.2% of applied Baygon was found in the root water. The extracted water fraction contained 16.7% of applied 14C activity as the beta-glucoside conjugate of o-hydroxyphenyl-N-methylcarbamate and 2.4% of the conjugate of applied 14C activity was lost. About 5.7% of 14C activity was found in solids and was not identified.

Conclusions:

(1) Considerable Baygon (about 45%) is taken up from root water into corn plants.

(2) Plant metabolism involves hydroxylation to o-hydroxy and N-hydroxy compounds and conjugation to form beta glucosides.

4.9 **Animal Metabolism:**

4.9.1 **The metabolic fate of Baygon in the rat: (28797)**

Rats were treated orally with carbonyl 14C, isopropyl 14C and isopropyl 3H labeled Baygon. 85% of the applied activity was eliminated within 16 hours. 20-25% as volatile compounds (CO_2, and some acetone) and 60% in the urine as conjugates. Depropylation to 2-hydroxy-phenyl -N-methylcarbamate was a major metabolic route. As well as hydrolysis of the carbamate to give isoprepoxy-phenol. **At least five other metabolites were identified. All** occured in conjugates form.

Conclusion:

(1) Baygon appears to be rapidly metabolized, conjugated and eliminated from the rat.

5.0 Summary

5.1 (A) **The behavior of Baygon in soil is not adequately defined. Soil metabolites are not identified or estimated. Data for field tests is not complete eg. sample depths are not given. Additional laboratory and field studies will be needed.**

5.2 (B) **Based on the data submitted, Baygon leaches readily in soil, is not adsorbed strongly to soil particles and can be expected to move laterally via runoff.**

5.3 (C) **Potential for accumulation in the food chain has not been determined. A fish accumulation study is neededd**

5.4 **Brief Summary of all data:**

5.4.1 **Persistance in soil is not adequately defined.**

5.4.2 **Baygon is relatively stable at acid and neutral PH and hydrolyzed in alkaline solution.**

5.4.3 **Based on the data submitted, Baygon does not photodegrade. Additional studies will be needed.because the studies submitted were run less than one day.**

5.4.4 Soil microorganisms participate in the degradation of Baygon. Baygon does not significantly effect soil microbial populations.

5.5.5 Crop uses are not involved in this review. However, data submitted indicate that Baygon can be taken up into plants from root systems.

5.5.6 Fish residue accumulation has not been determined. Studies will be needed.

REHey 8/15/75

Ronald E. Hey, Jr. 8/13/75
Arthur O. Schlossar 8/12/75

Environmental Chemistry Section
Efficacy and Ecological Effects Branch