8/1/79

Date Out EFB:

To: Product Manager Taylor (25)
(TS-767)

Through: Dr. Gunter Zweig, Chief
Environmental Fate Branch

From: Review Section No. 1 RWCook
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 7969-LE, 9F2189

Chemical: N,N-Dimethylpiperidinium chloride (BAS08301), mepiquat chloride)

Type Product: Plant Regulator

Product Name: PIX

Company Name: BASF Wyandotte Corp.

Submission Purpose: Cotton

ZBB Code: Sec. 3

Date in: 4/17/79 also 8-9-79

Date Completed: 8/1/79

Deferrals To:

____ Ecological Effects Branch

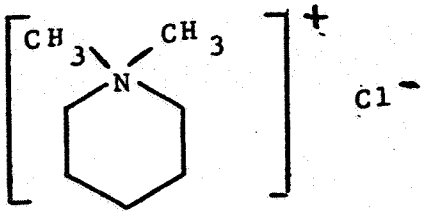
____ Residue Chemistry Branch

____ Toxicology Branch

1. Introduction

Applicant proposes registration of the plant growth regulator N,N-dimethylpiperidinium chloride which is claimed to modify cotton plant size by limiting internodal growth.

Structure



$C_7H_{16}ClN$

Solubility in water is greater than 100 grams per 100 grams water.

The product is tradenamed PIX™ and contains 4.2% active (0.35 pounds active per gallon.) The proposed common name for the active ingredient is mepiquat chloride, and is coded as BAS-08301 W or BAS-083.

2. Directions for Use

Time and rate of application depends on moisture supply. Apply at rate of 1-1.5 pints/A of PIX™ in 20 gallons of water by ground equipment or 5 gallons of water per acre. Subsequent applications at rate of 1/2 pint/A, but do not apply more than 2-1/2 pints of PIX™ per acre per season. Dosage is 0.044 pounds-0.066 pounds active ingredient per acre, with a per season limit of 0.11 pounds active ingredient. Do not apply PIX™ within 30 days of harvest. Do not graze or feed treated cotton to livestock within 30 days of application.

3. Discussion of Data

The environmental chemistry data included in Section J submitted in PP8G2022 and herein submitted by reference has been reviewed previously. See reviews dated 12-16-77 and 4-13-78.

Hydrolysis

Determination of the Hydrolysis Stability of Mepiquat Chloride by J. Redeker. Lab. Communication No. 831, February 1979, Section J-1.

Preliminary tests at pH 3,7,and 10 for 30 days at 45°C indicated no hydrolysis of mepiquat chloride.

Additional work using radiolabeled mepiquat chloride (^{14}c-2,6-ring labeled) at pH1-2 and pH 12-13 at 95°C for 5 or 7 days also showed that mepiquat chloride is stable to hydrolysis. By extraction/partition and electrophoresis, greater than 99% of the ^{14}C was found as parent compound under these extreme conditions.

Mepiquat chloride is stable to hydrolysis. ←

Photolysis in Water

Sensitized Photolysis of BAS-083W-^{14}C in Water, by R. Huber. Lab. Communication No. 1612, January 1979, Section J-2.

The UV spectra of mepiquat chloride indicates that the compound is stable to light. Therefore acetone sensitized, photolysis of mepiquat chloride was examined. The compound was radiolabeled in the 2,6-positions, and subjected to irradiation from high pressure mercury arc which simulated sunlight above 280 nm. Test concentration was 1.37 ppm, and test duration was 31 days. Radioassay of partitioned ^{14}C, with TLC and electrophoresis for identity confirmation.

Results

Material balance was greater than 99%, indicating no volatile materials are formed or lost. TLC analysis and electrophoresis assay show that the only material present is parent compound at greater than 99% of the initial amount.

Conclusions

Mepiquat chloride is stable to photolysis and to acetone sensitized photolysis. ←

Photolysis on Soil

Photolysis of BAS-083W-^{14}C on Soil by R. Huber. Lab. Communication No.842, January 1979, Section J-3.

Neuhofen loamy sand treated with 1 ppm of 2,6-^{14}C-mepiquat chloride and exposed in rotary evaporator to about 40,000 lux from sunlamps for 31 days. The ^{14}C-mepiquat chloride is extracted by forming dipicrylamine complex in dichloromethane and then complex is broken by hydrochloric acid.

Results

The aqueous phase of the extraction solvent contained essentially 0% of the ^{14}C, while unextracted ^{14}C in soil ranged from 3 to 25%. The extractable ^{14}C ranged from 76 to 97%. When the extracted ^{14}C was partitioned with aqueous HCl to decompose the complex, the majority of the ^{14}C was present in the aqueous phase with less than 3% occurring in the organic phase. From 76% to 86% of initial ^{14}C is still present as parent mepiquat chloride, by TLC and electrophoresis, at days 18 and 31 of this study. The remainder is not extractable from soil, and if degradates are present, they are present at amounts of 3% or less.

Conclusions

Mepiquat chloride stable to photolysis on soil in this strenuous irradiation experiment.

Partition Coefficients

Determination of the Partition Coefficients of Mepiquat in the System Water/n-Octanol, by J. Redeker. Lab. Communication No. 810, February 24, 1978, Section J-4.

Partition of 2,6-^{14}C-mepiquat chloride between octanol/water at 3 concentrations of mepiquat chloride

Concentration	K_{th} Coefficient
0.578 microgram/ml	0.00205
5.78 microgram/ml	0.00137
57.8 microgram/ml	0.00114

Soil-Degradation

Investigations into the Aerobe Degradation of ^{14}C-Dimethyl-piperidinium Chloride in Soil, by S. Otto. January 1979, Report No. 1505, Section J-5.

Mepiquat chloride was radiolabeled in the 2,6-positions. Two soils were studied: Neuhofen sandy loam (organic matter 2,58%, silt and clay 10.1%, pH 6.8) and Pfungstadt clay loam (organic matter 0.7%, silt and clay 40%, pH 7.4). The Neuhofen soil was treated at 0.08 ppm and 1 ppm and incubated at 20°C. The Pfungstadt soil was treated at 0.1 ppm and incubated at 25°C. Only the Neuhofen soil was studied for evolution of $^{14}CO_2$ by trapping. Extraction and partition by dipicrylamine/dichloromethane procedure. Assay by LSC and TLC scanning of ^{14}C.

Results

Neuhofen sandy loam soil treated at 0.08 showed 78% loss of extractable mepiquat chloride in the first 7 days, with concurrent increase in nonextractable ^{14}C to about 25% of applied ^{14}C. By day 30, only 8% of applied ^{14}C remained as parent compound and at the end of the experiment, 120 days, only 4% of applied ^{14}C was still present as mepiquat chloride. Soil unextractable ^{14}C increased through 30 days to about 25% then declined to 19% of applied ^{14}C.

Evolution of $^{14}CO_2$ totaled 68.8% over 29 days with the greatest amount over the first 10 days. At treatment level of 1 ppm, the degradation of mepiquat chloride is slower in the Neuhofen soil than at 0.08 ppm. At 1 ppm, little degradation occurred in the first 14 days, with most degradation or loss occurring between 14 and 30 days. At 14 days 87% applied still present as parent while at 30 days only 13% still present as parent. At the 210 day end of study, only 5% of initially applied ^{14}C was present as parent mepiquat chloride and soil unextractable ^{14}C was 13.5%. In Pfungstadt clay loam, at 0.1 ppm, the rate of degradation of mepiquat chloride was similar to the rate in the Neuhofen at the similar treatment of 0.08 ppm. Soil unextractable ^{14}C accounted 15% of applied ^{14}C at the termination of study at 60 days.

Conclusions

Degradation of mepiquat chloride appears to be concentration dependent, with slower degradation at the higher concentration. The higher concentration also shows a lag period before initiation of degradation. The primary degradate of mepiquat chloride in Neuhofen sandy loam is CO_2. At the higher concentration, one other degradate is shown on TLC-radioscan but the amount <0.01 ppm is too low to attempt to identify.

At ambient or use concentrations in the environment, mepiquat chloride is not expected to be persistent, with an estimated halflife of less than 30 days. Calculated $T_{1/2}$ are:

Neuhofen 0.08 = 1 day
Neuhofen 1 ppm = 17 days
Pfungstadt 0.1 ppm = 9 days

Soil Degradation

Investigations on the Degradation of ^{14}C-dimethylpiperidinium Chloride (BAS 083 00 W) in Soil under Aerobic, Anaerobic and Sterile Aerobic Conditions, by R. Hamm. January 1979, Report No. 1623, Section J-6.

Radiolabeled ^{14}C-2,6-mepiquat chloride was used to treat Neuhofen loamy sand at rate of 1.1 ppm which is about 10X the normal dosage rate. Treated soils maintained under aerobic, anaerobic (flooded), or sterile-aerobic conditions. Active ingredient extracted by dipicrylamine/dichloromethane, and extracts counted on LSC. TLC used to characterize extractable ^{14}C. Dilution series used to count bacteria, actinomycetes and fungi in soil.

Results

In both anaerobic and sterile aerobic treatments, there was no loss of total radioactivity during 60 days incubation, while in aerobic treatments, total radioactivity decreased 57%.

Extractable radioactivity in aerobic treatment declined to about 15% of initial amount at 60 days, and nonextractable ^{14}C in soil went from 19% at 0 day to 29% at 60 days. Water soluble ^{14}C declined slowly from 6% at 0 days to 3% at 60 days.

In the sterile aerobic soil samples, extractable ^{14}C did not show any decline, although water soluble ^{14}C decreased from 11% to 4% and nonextractable in soil increased from 19% to 30% between 0 and 60 days.

Under anaerobic conditions, extractable ^{14}C declined from 81% to 72% of applied, and nonextractable in soil increased from 22% to 37% between 0 and 60 days.

When extractable ^{14}C was examined by TLC, only intact parent compound was found.

Microorganism counts showed little change under anaerobic (flooded) conditions for bacteria with slight decline in actinomycetes and slight increase in fungi. Under aerobic conditions, bacteria increased during first seven days, then same as controls. Both actinomycetes and fungi declined the first seven days but recovered. The relative percentage population of gram-negative bacteria increased from 10% of total bacteria at 0 days to 35% of total bacteria at 14 days, and then declined to values about 10% points above controls. Applicant postulates that this change in the relative bacteria population may indicate that the gram-negative bacteria may be responsible for the degradation of mepiquat chloride.

Conclusions

Degradation of mepiquat chloride by soil microorganisms under aerobic conditions has been demonstrated. Anaerobic soil does not show degradation of mepiquat chloride.

Effects of Mepiquat Chloride on Microorganisms

Investigations on the influence of mepiquat chloride (BAS 083 W) on various soil microorganisms. Report No. 1629, R. Hamm, April, 1979. Section J-13, EPA Accession No. 098865.

The influence of mepiquat chloride at 0.1 and 1.0 ppm on the enzymatic activity of several microbial enzymes, and on soil respiration and microorganism flora, were examined. The following tests and test organisms were employed:

a) Amylase activity:
   Trichoderma viride, Bacillus subtilis, Streptomyces aureofaciens
b) Cellulase activity:
   T. viride, Cellulomonas sp., Streptomyces venezuelae.
c) Proteinase:
   B. subtilis, S. aureofaciens, T. viride
d) Pectinase:
   Fusarium oxysporum
e) Algal growth:
   Chlorella, Nostoc muscorum
f) Soil respiration.
g) Nitrification
h) Nitrogen fixation:
   Azotobacter chroococcum, A. vinelandii
i) Microorganism plate count.

Results

Amylase activity of T. viride is greater than control. Other two organisms showed activity decrease but almost equal to control at termination.

Cellulase activity of Cellulomonas sp. and S. venezuelae inhibited at first but recovered, while T. viride is strongly inhibited but some slow recovery.

Proteinase activity is not affected by mepiquat chloride.

Pectinase activity is reduced about 20% by 0.1 ppm mepiquat chloride.

Algal growth is not affected by 1.0 pp mepiquat chloride.

Soil respiration is increased by addition of 0.1 pp, but at 48 hours respiration is about control level. Second addition of 1.0 ppm does not show the increase in rate of respiration.

Nitrification is not affected by mepiquat chloride at 1 ppm.

No effect is shown on nitrogen fixation of A. chroococcum and A. vinelandii at 0.1 and 1.0 ppm.

Plate counts show fungi and actinomycetes are inhibited at 1.1 ppm for 3 days and recovery by 7 days. Bacteria exhibited increase, most notably in the proportion of gram-negative bacteria versus total bacteria.

Conclusions

The effects of mepiquat chloride are temporary inhibition of amylase, cellulase, and pectinase activity. No effects on algal growth, proteinase, soil respiration, nitrification, and nitrogen fixation.

Leaching

Soil leaching of Mepiquat-Chloride (BAS 083 01 W = ⊕PIX, N,N-Dimethyl-piperidinium-chloride) by J. Elzner, Lab Communication No. 848, March 13, 1979, Section J-7.

Formulated product PIX was applied to four standard soils at rate of 0.375 kg active ingredient per hectare (5X normal application rates). The four soils are standard soils according to the protocols of Biologische Bundesanstalt fuer Land-und Forstwirtschaft. The soil columns were eluted with 20 cm water in 2 days.

length of soil column

Soil	O.Carbon	pH	CEC	Sand	Silt	Clay
Sand	0.5%	6.8	3.7	95	1	4
Loamy sand	2.6%	6.1	10	83	7	10
Sandy loam	1.1%	7.1	8.6	78	11	11
Loam	0.7%	7.4	13	66	18	16

Results

No detectable amounts of mepiquat chloride were found in the leachate of the four soils. The soil was not extracted for mepiquat chloride and no material balance can be calculated. Applicant postulates that ion exchange properties of the soils prevent leaching.

Conclusions

Under the conditions of the experiment, leaching of mepiquat chloride did not occur.

Aged Leaching

Since mepiquat chloride has a halflife of less than 20 days and since the primary product of soil metabolism is CO_2, the aged leaching characteristics of mepiquat chloride are not germane.

Adsorption Coefficients

Determination of the Constants of the Isotherm of Mepiquat in the System Soil/Water, by J. Redeker. October 18, 1979, Communication No. 813, Section J-8.

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Radiolabeled ^{14}C-2,6-mepiquat chloride used in three soils to determine adsorption and desorption isotherms

Soil	pH	CEC	O.C
Loam	7.3	13	0.58%
Loamy sand	7.2	10	2.66%
Sand	7.0	3.7	0.51%

Adsorption studies used 500 mg soil and 2.5 ml or 3.0 ml aqueous solution, while desorption was into distilled water or saturated calcium sulfate solution.

Results

Adsorption

Soil	K_A@22°C	K_A18°C	1/n@22°C	1/n 18°C
Loam	13.36	17.062	0.972	0.980
Loamy sand	5.74	7.4066	0.963	0.933
Sand	3.90	5.17	0.976	0.914

Desorption with water

	K_d@22°C	K_d@18°C	1/n@22°C	1/n@18°C
Loam	16.58	20.346	0.990	0.906
Loamy sand	7.789	10.123	0.948	0.877
Sand	4.816	9.049	0.899	0.972

Desorption with calcium sulfate

Loam	4.777	0.899
Loamy sand	2,589	0.886
Sand	1,479	0.767

Field Dissipation

Determination of BAS 083 Residues in Soil, Carolyn E. Portnoy
Report No. PR-193, February 28, 1979.

Field tests of mepiquat choride were conducted in:

Keiser, Arkansas	Loam
Phoenix, Arizona	Clay loam
Merced, California	Silt loam
Greenville, Mississippi	Silt loam
Lewiston, North Carolina	

Soils were treated with mepiquant chloride at rates of 20 or 40 gram/A and multiple applications of 20+10, 20+10+10, 40+20, or 40+20+20 gram/A. Soil samples were obtained at various intervals up to 110 days after application. The soils were extracted with 50% aqueous 4N HCl in methanol and, and the humic substances removed by precipitation at pH 12-13. Complex was formed with dipicrylamine and mepiquat chloride. Demethylation methylpiperidine allows gas chromatography with nitrogen specific detector. [Residue Method #23]

Results

The highest concentration of mepiquat chloride was found on day 0 at 0.08 ppm. By day 1, all soil samples were 0.06 ppm or less, with the large majority of samples below the limits of detection at 0.05 ppm.

Conclusions

Residues of mepiquat chloride in field samples are at or below limits of detection one day after application. The non-detectability of residues is due in part to the low dosage rates recommended in the use directions.

Rotational Crops

Uptake of Aged BAS 083 W-^{14}C Soil Residues by Rotational Crops.
by R. Huber, S. Otto. Report No. 1610, January 1979, Section J-10

Neuhofen loamy sand (organic carbon 2.6%, sand 67%, silt 7%, clay 10%, particles, 20u 17%, pH 6.8, CEC 10) was treated with 0.08 ppm (about normal dosage) and aged aerobically for 60 and 365 days.

Corn, wheat, soybeans, and sugarbeets were harvested at 30 days and plant maturity. Radioassay of ^{14}C-2,6-mepiquat chloride by combustion-LSC.

Results

The maximum residue found in rotational crops was 0.0111 ppm in soybean plants 30 days after planting into 60 day aged soil. All other rotational crop samples were below 0.0091 ppm.

Conclusions

Mepiquat chloride does not accumulate to a significant degree in rotational crops.

Uptake of Aged BAS 083-W-^{14}C by Rotational Crops

Aged	Sampled	Plant Part	^{14}C ppm
60 days	1 month	soybeans-plant	0.0091
		soybeans-roots	0.0111
		corn-plant	0.0037
		corn-roots	0.0049
		sugarbeets-plant	0.0012
		sugarbeets-roots	0.0079
60 days	harvest	soybeans-beans	0.0042
		soybeans-pods	0.0041
		soybeans-stalk/leaves	0.0036
		soybeans-roots	0.0042
		corn-kernel	0.0008
		corn-stalk/leaves	0.0015
		corn-roots	0.0050
		sugarbeets-roots	0.0012
		sugarbeets-leaves	0.0012
365 days	1 month	soybeans-plant	0.0063
		wheat-plant	0.0026
		sugarbeets-plant	0.0016
365 days	harvest	soybeans-beans	0.0019
		soybeans-pods	0.0012
		soybeans-stalk/leaves	0.0031
		soybeans-roots	0.0034
		wheat-grains	0.0010
		wheat-ears	0.0019
		wheat-stalk	0.0037
		wheat-roots	0.0037
		sugarbeets-roots	0.0003
		sugarbeets-leaves	0.0001

Fish Accumulation

^{14}C-BAS 083 00 W Bluegill Sunfish, Lepomis macrochirus Bioconcentration Study. May 10, 1978. Prepared for BASF Wyandotte Corporation by Union Carbide Corporation Environmental Services. UCES Proj. No. 11506-34 BWC Proj. No. IV-1-G-132, Section J-11.

Bluegill sunfish exposed to nominal concentration of 1.0 ppm of ^{14}C-2,6-mepiquat chloride for 29 days and depuration for 14 days. Mortality was low. The fish were 1.14 gram and 45 mm. Whole body fish, edible portions, and non-edible portions of fish were combusted and counted.

Results

The mean peak accumulation of mepiquat chloride was less than 2.3 ppm in whole body bluegill. Edible portions contained less than 1 ppm (mean) and non-edible portions contained slightly more.

Depuration of such low levels of residue was not detectable due to variance of individual samples.

Conclusions

Mepiquat chloride does not accumulate in edible portions, non-edible portions or whole body bluegill sunfish.

Residues of Mepiquat Chloride in Bluegill in ppm

Days	Whole Fish	Edible	Non-edible
1	0.17	0.29	0.207
3	0.232	0.25	0.224
7	0.373	0.318	1.02
10	0.39	0.186	0.66
14	0.959	0.851	1.35
22	2.23	0.837	1.12
29	1.26	0.693	0.92
Depuration			
1	0.124	0.155	0.164
3	1.7	1.32	1.55
7	0.778	0.748	0.89
10	0.729	1.56	1.79
14	0.549	1.07	1.59

Fish Accumulation

^{14}C-BAS 083 00 W Channel Catfish Ictalurus punctatus (Rafinesque) Bioconcentration Study. June 21, 1978. Prepared for BASF Wyandotte Corporation by Union Carbide Corporation Environmental Services. USCES Proj. No. 11506-34, BWC Proj. No. IV-3-G-132, Section J-12

Catfish exposed to ^{14}C-2,6-mepiquat chloride in sandy loam soil. The soil was treated at rate of approximately 20 grams per acre, resulting in a soil concentration of about 0.08-0.1 ppm. The treated soil was aged aerobically for 7 days prior to addition of water, and 21 days with water, before addition of water. Due to essentially 100% mortality in both control and treated soil tanks on day 24 of fish exposure caused by epizootic infection Ichthyophthirius multifilis, the depuration period could not be tested. To test the depuration of mepiquat chloride from catfish, a short flowthrough test was run. The flowthrough exposure continued 14 days, to reach approximately the uptake shown in the aged soil study, and then depuration was started. The catfish were about 3.09g. Whole body fish, edible portions, non-edible portions, and soil samples were combusted while water samples were counted directly.

Results

Static Aged Soil Test

The mean concentration of ^{14}C-mepiquat chloride in water during the fish exposure period was 0.001 ppm, while the soil showed 0.038 ppm during this same time. The maximum mean concentration of ^{14}C in whole body catfish occurred on day 10 at 0.0038 ppm, while in edible portions maximum mean was 0.00156 ppm on day 22 and in non-edible portions 0.00302 ppm the same day.

Flowthrough Test

At 14 days dynamic exposure, catfish showed the following concentration of ^{14}C-mepiquat chloride:

Whole body	0.00309 ppm
Edible portions	0.00133 ppm
Non-edible portions	0.00249 ppm
Water	0.00061 ppm

During 14 days of depuration, the catfish showed from 76% (edible portions) to 89% (whole body fish, non-edible portions) decline in the concentration of mepiquat choride in the fish.

Conclusions

Mepiquat chloride does not accumulate to significant degree in aged soil catfish test nor in short-term flowthrough test. During depuration, catfish show 76-89% decline in residue concentration. The little amount of mepiquat which is accumulated is almost completely depleted during depuration.

Residues of ^{14}C-Mepiquat Chloride in Aged Soil Exposure Test ppm

Days	Fish Days	Soil	Water	Whole	Edible	Non-edible
0		0.0523	---	---	---	---
1		0.166	---	---	---	---
7		0.0587	---	---	---	---
14		0.0785	0.00003	---	---	---
15		0.0485	0.0001	---	---	---
22		0.0448	0.00027	---	---	---
29		0.0415	0.00067	---	---	---
36		0.0444	0.00091	---	---	---
37	1	0.0431	0.00098	0.00035	0.000169	0.000409
39	3	0.0434	0.00101	0.00117	0.000518	0.00109
43	7	0.0347	0.00112	0.00168	0.00121	0.00192
46	10	0.0429	0.00113	0.0038	0.00115	0.00268
50	14	0.0308	0.00123	0.00256	0.00151	0.00288
58	22	0.0301	0.00123	0.00332	0.00156	0.00302
60	24	0.0342	0.00079	0.00256	0.00089	0.00236

Termination due to 100% mortality in both treated and control tanks.

Residues of ^{14}C-Mepiquat Chloride in Flowthrough/ Depuration in Catfish ppm

Days	Water	Whole	Edible	Non-edible
0	0.000917	---	---	---
1	0.000806	---	---	---
3	0.000883	0.000371	0.000534	0.00122
7	0.000716	---	---	---
10	0.000876	0.00337	0.000582	0.000758
14	0.00061	0.00309	0.00133	0.00249
15	---	0.00184	0.00106	0.00181
17	---	0.00119	0.00062	0.00052
21	---	0.00044	0.00086	0.00061
24	---	0.00027	0.00032	0.00040
28	---	0.00034	0.00031	0.00026

4. Conclusions

Mepiquat chloride is stable to hydrolysis at both environmentally ambient conditions and at elevated temperature/extreme pH conditions.

Mepiquat chloride is stable to photolysis under acetone sensitized conditions, and it can be concluded that stability under non-sensitized conditions can be expected. Also stable to photolysis on soil surfaces.

The major degradate of mepiquat chloride in aerobic soil metabolism studies is CO_2 accounting more than 50% over 30 days. At 30% extractable parent was less than 10%, and 4% at 120 days. Nonextractable materials reached 25% but declined. The calculated halflife of parent compound in 3 soils was less than 20 days. Degradation of mepiquat chloride is more rapid at normal dosage rates than at 10X.

Degradation of mepiquat chloride in anaerobic (flooded) and sterile soils is very slow, indicating that aerobic microorganisms are chiefly responsible for degradation. No significant effects of mepiquat chloride on soil bacteria, actinomycetes or fungi.

Mepiquat chloride does not appear in leachate water from soil columns, but movement in soil was not examined. Soil adsorption coefficients in 3 soils ranged from 3.9 to 17, while soil desorption coefficients in the 3 soils ranged from 4.8 to 20.3. Mepiquat chloride is not expected to be mobile to a significant degree.

At recommended dosage rates, the residues of mepiquate chloride in field dissipation studies are generally less than the 0.05 ppm limit of detection by one day after application. No residues greater than 0.05 ppm were detected in any sample at intervals from 3 to 110 days, after application. Since the normal or recommended dosage rate is about 0.1 ppm in soil, it is unlikely that residues would be detectable at longer intervals.

Rotational crops do not accumulate residues of mepiquat chloride.

Neither bluegill sunfish nor channel catfish accumulate residues of mepiquat chloride, and catfish depurate 76-89% of the tiny amount present.

5. Recommendations

EFB concurs in the use of mepiquat chloride on cotton, as proposed in this submission.

RWCook 8-20-79

R. W. Cook July 27, 1979
Review Section #1
Environmental Fate Branch
Hazard Evaluation Division