

US EPA ARCHIVE DOCUMENT

Shaughnessy No.:006315

Date Out of EAB: 2/17/87

To: Jeff Kempter
Product Manager 32
Registration Division (TS-767)

From: James D. Adams, Ph.D., Acting Chief *JDA*
Review Section #1
Exposure Assessment Branch
Hazard Evaluation Division (TS-769)

Attached, please find the EAB review of...

Reg./File # : 8622-EL

Chemical Name: 1-Bromo-3-Chloro-5,5-Dimethyl Hydantoin

Type Product : Disinfectant

Product Name : HALOBROM

Company Name : AMERIBROM

Purpose : Registration for use in indoor and outdoor swimming pools
and spas.

Date Received: 9/3/86

Action Code(s): 161

Date Completed: 2/5/87

EAB #(s) : 60874

Days: 1

Deferrals to: _____ Ecological Effects Branch
_____ Residue Chemistry Branch
_____ Toxicology Branch

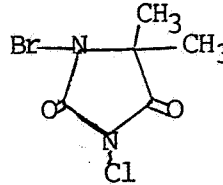
Monitoring study requested by EAB:

Monitoring study voluntarily conducted by registrant:

1
24

1.a CHEMICAL:

1-Bromo-3-Chloro-5,5-Dimethyl Hydantoin
N,N'-Bromo, Chloro-Dimethyl Hydantoin.
HALOBROM



1.b Physical Properties:

Not included in this submission.

2. TEST MATERIAL: 96% pure N,N'-Bromo, Chloro-Dimethyl Hydantoin (cold).

3. STUDY/ACTION TYPE:

Review of studies for registration for use in swimming pools and spas (indoor and outdoor).

4. STUDY IDENTIFICATION: Acc. # 264468.

- 1) Hydrolysis of N,N'-Bromo, Chloro-Dimethyl Hydantoin as a function of pH.
- 2) Photodegradation of N,N'-Bromo, Chloro-Dimethyl Hydantoin in Water pH 7.

5. REVIEWED BY:

Akiva D. Abramovitch, Ph.D.
Chemist
Environmental Chemistry Review Section 1/EAB/HED/OPP

Akiva Abramovitch
Date: 2/5/87

6. APPROVED BY:

James D. Adams, Ph.D., Acting Chief
Supervisory Chemist
Environmental Chemistry Review Section 1/EAB/HED/OPP

Date: 2/17/87
James D. Adams

7. CONCLUSIONS:

All the data requirement for the registration of bromo chloro dimethyl hydantoin for use in indoor and outdoor swimming pools and spas has been satisfied.

Should the registrant seek registration for other uses, the aqueous photodegradation study might have to be repeated at pH 5.

Hydrolysis and aqueous photodegradation proceeded at relatively fast rate to N-bromo-dimethyl hydantoin and dimethyl hydantoin. Although identical degradates were formed, photodegradation under natural sunlight at pH 7 at 25°C proceeded faster (half life of 0.5 hour) than in non-exposed sample (half life of 4 hours). N,N'-bromo, chloro-dimethyl hydantoin is most stable at pH 5 with a half life of about 50 hours.

8. RECOMMENDATIONS:

EAB concurs with the proposed registration for use in indoor and outdoor swimming pools and spas.

2
25

9. BACKGROUND:

A. Introduction: This is the first submission of environmental fate data on the chemical by this registrant.

B. Directions for Use:

N,N'-Bromo, Chloro-Dimethyl Hydantoin is to be used as a disinfectant in swimming pools and spas (indoor and outdoor use). The commercial material contains 96% of the active ingredient.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

10.1 A. Study Identification: Hydrolysis of N,N'-Bromo, Chloro-Dimethyl Hydantoin as a function of pH.

The study was conducted by Analyst, LTD. in Israel by L. Yaron.

B. Materials and Methods:

A stock solution of halobrom was prepared by dissolving 100 mg of halobrom in 2 ml of acetonitrile and adding water to a volume of 100 ml. The actual studies were conducted by diluting the stock solutions by a factor of 10 with the corresponding buffer. The following buffers were used:

0.05 M citric acid + NaOH for pH 5

0.05 M potassium phosphate + NaOH for pH 7

0.05 M boric acid in KCl + NaOH for pH 9

All the buffers and solutions were sterilized in autoclave at 121°C.

The studies were conducted in a thermostatic bath at 25°C in the dark and under nitrogen atmosphere at a concentration of 100 ppm. Analysis was done in duplicates by HPLC using a UV detector at 214 nm.

C. Reported Results:

Hydrolysis at 25°C

<u>pH</u>	<u>K (hr⁻¹)</u>	<u>half-life (hr)</u>
5	.01226	50.53
	.01346	51.49
7	.13748	5.04
	.13199	5.25
9	.18158	3.82
	.19334	3.58

The two main degradates were N-Bromo-Dimethyl Hydantoin and Dimethyl Hydantoin (DMH).

D. Study Author's Conclusions:

No additional conclusions to those listed in the results, above. The registrant explained that halobrom dissolves in water very slowly and therefore it was dissolved initially in acetonitrile to minimize degradation during the dissolution process.

26 3

E. Reviewer's Discussions and Interpretation of Study Results:

The study appears to provide valid scientific results in fulfillment of the data requirement. It appears that the test material was the actual commercial product which is also 96% active ingredient. The reviewer is satisfied with the information provided above.

10.2 A. Study Identification: Photodegradation of N,N'-Bromo, Chloro-Dimethyl Hydantoin at pH 7.

The study was conducted by Analyst, LTD. in Israel by Dr. H. M. Schlesinger.

B. Materials and Methods:

The study was conducted with identical solutions to those used for the hydrolysis at pH 7 buffer at 25°C under sterile conditions and under nitrogen (see 10.1, above). One sample was exposed to natural sunlight and irradiation was measured at 2100-2200 microeinsteins m²/sec inside the flask. Another sample was kept in the dark as control. Analysis was conducted in duplicates by HPLC.

C. Reported Results:

Photodegradation under sunlight proceeded to yield identical products to those obtained via hydrolysis (see 10.1, above). Degradation under sunlight proceeded a little faster (half life of 0.30-0.34 hours) than observed for the non-exposed control sample (half life of 4.12 hours).

D. Study Author's Conclusions:

No additional conclusions to those stated in the results in C, above.

E. Reviewer's Discussions and Interpretation of Study Results:

The study should have normally been conducted at pH 5 to minimize the effect of hydrolysis on the results (see slower hydrolysis at pH 5 in 10.1 above than at pH 7 in which the study was conducted). However, the reviewer understands that the registrant chose a pH 7 condition to better simulate actual use conditions in pools and spas. Therefore, for the registered use, the data fulfills the data requirement and indicates that under natural sunlight degradation to N-bromo-dimethyl hydantoin and dimethyl hydantoin proceeds faster (x8) than observed in the dark. Should the registrant seek registration for agricultural uses, a photodegradation study at pH 5 might need to be conducted.

11. COMPLETION OF ONE LINER:

Not completed.

12. CBI APPENDIX:

None.

27⁴