

US EPA ARCHIVE DOCUMENT

8-11-83

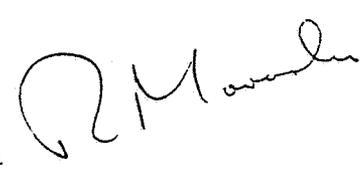
128101  
Shaughnessy No.

Date Out of EAB: 11 AUG 1983

# FILE COPY

To: D. Mountfort  
Product Manager #23  
Registration Division (TS-767)

From: Richard V. Moraski, Ph.D., Acting Chief  
Environmental Chemistry Review Section 1  
Exposure Assessment Branch  
Hazard Evaluation Division (TS-769C)



Attached please find the EFB review of...

Reg./File No.: 707-RTL

Chemical: 4.5-Dichloro-2-n-octyl-3(2H)-isothiazolone  
4-Chloro-2-n-octyl-3(2H)-isothiazolone

Type Product: Microbiocide

Product Name: Anti-foulant C-9211 M

Company Name: Rohm & Haas

Submission Purpose: Manufacturing use product for marine  
coatings.

ZBB Code: 3(c)(5)

ACTION CODE: 115

Date In: 4/25/83

EFB # 3332

Date Completed: 8/4/83

TAIS (level II) Days

61 3.5

Deferrals To:

Ecological Effects Branch

Residue Chemistry Branch

Toxicology Branch

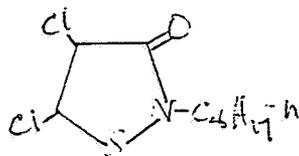


## 1.0 INTRODUCTION

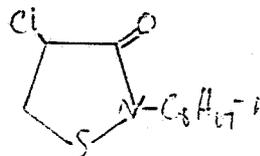
Chemical Name and Type of Pesticide: RH-5287 (4,5-dichloro-2-n-octyl-3(2H)-isothiazolone), 35% ai and RH-0085 (4-chloro-2-n-octyl-3(2H)-isothiazolone), 5% ai, microbiocide.

Trade Name: Anti-Foulant C-9211M

Chemical Structure:



RH-5287



RH-0085

Rohm and Haas is applying for the registration of a manufacturing-use product, the antifoulant C-9211M, that contains the two active ingredients shown above. The product is designed to be formulated by other manufacturers, possibly in combination with other antifoulants, for use as a marine coating.

## 2.0 DIRECTIONS FOR USE

See attached label.

## 3.0 DISCUSSION OF DATA

### 3.1 HYDROLYSIS

- 3.1.1  $^{14}\text{C}$ -RH-5287 hydrolysis study, Technical Report No. 36F-81-19, 23 June 1981, Section J., Acc. No. 249934.

#### Experimental Procedures

$^{14}\text{C}$ -RH-5287 was added at 10 ppm to three buffers at pH 5, 7, and 9 and stored in the dark ( $23 \pm 2^\circ\text{C}$ ) for 30 days. The 0.01 M sodium salt buffers used for pH 5, 7, and 9 solutions were citrate, phosphate, and borate, respectively. Methanol at 16% was used as a cosolvent. Samples were removed at 1, 3, 7, and 30 days, extracted twice with ethyl acetate, and analyzed by TLC.

#### Results

Table 1 shows the extraction efficiencies of  $^{14}\text{C}$ -RH-5287 from the treated buffer solutions at the various sampling times. The percent recovery ranged from 76.1 to 99.4. Table 2 shows the radiocarbon recoveries from the TLC

plates and indicates the progressive degradation occurring in pH 5 and pH 9 buffer solutions and the very little degradation at pH 7. Figures 1 and 2 graphically depict the decomposition at pH 5 and pH 9, and show the half-lives obtained: 9 days at pH 5 and 2.5 days at pH 9. The degradate at both pH 5 and pH 9 was reported to be RH-0085, but a later study (that will be reviewed here) showed this to be incorrect.

#### Conclusion

Degradation of RH-5287, the major active ingredient in C-9211M, was fairly rapid at pH 5 and pH 9.

- 3.1.2  $^{14}\text{C}$ -RH-0085 hydrolysis study, Technical Report No. 367-81-20, 23 June 1981, Section J, Acc. No. 249934.

#### Experimental Procedure

See Section 3.1.1.

#### Results

Tables 3 and 4 show the radiocarbon recoveries from the treated buffer solutions and TLC plates, respectively. All recoveries from the solutions exceeded 93%. Hydrolysis was not observed (TLC recoveries) in pH 5, 7, or 9 buffer solutions.

#### Conclusion

The minor active ingredient of C-9211M, RH-0085, was stable to hydrolysis under the test conditions. The hydrolysis studies of RH-5287 and RH-0085 satisfy this data requirement.

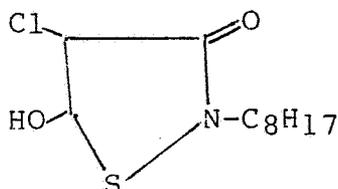
- 3.1.3 Identification of the pH 5 hydrolysis products of RH-5287, Technical Report No. TR36F-82-05, Exhibit J.3-4, Section J, Acc. No. 249934.

#### Experimental Procedure

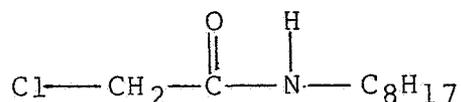
Two studies were conducted: one at room temperature for 110 days using unlabeled RH-5287, and another by refluxing  $^{14}\text{C}$ -RH-5287 for 4 hours. The study at room temperature tested 10 ppm in a pH 5 buffer (0.01 M) stored in the dark. Samples were taken after 7 and 110 days and analyzed by EC-GLC, TLC, and GC-MS. The refluxing study tested 340 ppm of the labeled product in 0.1 M phthalate buffer.

## Results

The formation of RH-0085 was not detected in either study. The major degradate in the refluxed study was 4-chloro-5-hydroxy-2-(n-octyl)-3(2H)-isothiazolone, the structure of which is:



This degrades to 2-chloro-n-octyl-acetamide (major product of room temperature study after 100 days) that has the structure:



## Conclusion

The study revealed the true degradates of RH-5287 hydrolysis, a fact that was suspected (that RH-0085 was not a degradate) in the initial study (Section 3.1.1).

### 3.2 ACTIVATED SLUDGE

- 3.2.1 <sup>14</sup>C-RH-5287 activated sludge metabolism, Technical Report No. 36F-81-18, 23 June 1981, Exhibit J.2-1, Section J, Acc. No. 249934.

This study will not be reviewed at this time, since it is not now an environmental chemistry data requirement.

### 3.3 ANCILLARY PRODUCT INFORMATION

- 3.3.1 The migration of antifoulant C-9211M from paint into synthetic sea water, Technical Report No. TSC-437, 3 February 1982, Exhibit J.1-1, Section J, Acc. No. 249934.

This is not an environmental chemistry data requirement, but is useful information concerning product behavior in sea water. For that reason, the study is reviewed.

## Experimental Procedure

The migration of Experimental Antifoulant C-9211M from two representative antifouling paints into synthetic sea water under static conditions was followed quantitatively over 32 days.

Two commercial vinyl/rosin-based antifouling paints, one containing tributyltin fluoride (TBTF) as the primary toxicant and the other cuprous oxide ( $\text{Cu}_2\text{O}$ ), were each spiked with a representative level (3% active based on paint weight) of C-9211M. Films were applied to aluminum panels primed with the recommended anticorrosive primer system and immersed in artificial sea water. The water was exchanged with fresh sea water at 1, 6, 15 and 32 days to simulate non-equilibrium use conditions and analyzed by gas-liquid chromatography (GLC).

### Results

Table 5 summarizes the weight losses of the active ingredients in C-9211M from the test paints. The loss of the minor active ingredient, RH-0085, was much greater (over 10X, see circled values in Table 5) than for the major active ingredient, RH-5287. This is probably due to the minor ai having a higher water solubility (60 ppm) than the major ai (2.3 ppm). The average daily release rates of the active ingredients in C-9211M from the two antifoulant paints (nominal film thickness about 4 mils, dry) after exposure to synthetic sea water for 32 days was  $0.658 \text{ ug/cm}^2/\text{day}$  for the tributyltin fluoride-based paint and  $0.560 \text{ ug/cm}^2/\text{day}$  for the cuprous oxide-based paints.

### Conclusion

The study provided very useful information on the leaching rates of the active ingredients in C-9211M in synthetic sea water when these actives are in combination with other antifoulants in typical paint formulations.

#### 4.0 CONCLUSION/RECOMMENDATION

- 4.1 The hydrolysis studies of the major (RH-5287) and minor (RH-0085) active ingredients of C-9211M indicate the major one degrades at pH 5 and pH 9, while the minor one was not hydrolyzed at pH 5, 7, and 9. The study satisfies this data requirement.

A study on the leaching of the active ingredients of C-9211M in synthetic sea water for 32 days showed  $0.658 \text{ ug/cm}^2/\text{day}$  for a tributyltin fluoride-based paint and  $0.560 \text{ ug/cm}^2/\text{day}$  for a cuprous oxide-based paint.

- 4.2 EAB does not concur with the proposed use of the antifoulant C-92121M as a formulating product for marine coatings, since, as a product with noncrop, aquatic use, several data gaps exist:

1. Photodegradation in water
2. Aerobic and anaerobic aquatic metabolism

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3. Batch equilibrium (adsorption/desorption)
  4. Sediment and water field dissipation
  5. Accumulation in irrigated crops, fish, and aquatic nontarget organisms.
- 4.3 No accurate assessment of the environmental fate of the active ingredients of the Anti-Foulant C-9211M is possible at this time due to the data gaps that currently exist. Hydrolysis would very likely occur in sea water, since it has an alkaline reaction (about pH 7.9-8.3). Leaching of the actives into sea water has already been demonstrated.

*Herbert L. Manning*

Herbert L. Manning, Ph.D.  
Review Section No. 1  
Exposure Assessment Branch  
Hazard Evaluation Division

Draft Label

Anti-Foulant C-9211M

Rohm and Haas Company

March 30, 1983

PROPERTY OF ROHM AND HAAS COMPANY PHILADELPHIA

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\_\_\_\_\_ Identity of product inert ingredients.

\_\_\_\_\_ Identity of product impurities.

\_\_\_\_\_ Description of the product manufacturing process.

\_\_\_\_\_ Description of quality control procedures.

\_\_\_\_\_ Identity of the source of product ingredients.

\_\_\_\_\_ Sales or other commercial/financial information.

A draft product label.

\_\_\_\_\_ The product confidential statement of formula.

\_\_\_\_\_ Information about a pending registration action.

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\_\_\_\_\_ The document is a duplicate of page(s) \_\_\_\_\_.

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- Identity of product inert ingredients.
  - Identity of product impurities.
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  - Identity of the source of product ingredients.
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