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SHAUGHNESSEY NO.

REVIEW NO.

EEB BRANCH REVIEW

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PETITION OR EXP. PERMIT NO. _____

DATE OF SUBMISSION 3-30-83

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RD ACTION CODE/TYPE OF REVIEW 115/New Chemical

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

DATA ACCESSION NO(S). #249935

PRODUCT MANAGER NO. R. Mountfort (23)

PRODUCT NAME(S) Anti-Foulant C-9211M

COMPANY NAME Rohm and Haas Company

SUBMISSION PURPOSE Proposed full registration of manufacturing use
of new antifoulant compound

SHAUGHNESSEY NO.	CHEMICAL, & FORMULATION	% A.I.
<u>128101</u>	<u>4-5 dichloro-2-N-octyl-3(2H)-isothiazolone</u>	<u>35%</u>
<u>128102</u>	<u>4-chloro-2-N-octyl-3(2H)-isothiazolone</u>	<u>5%</u>

100 Pesticide Label Information

100.1 Pesticide Use

Marine antifoulant C-9211 M is a biocide designed for use in protecting ship bottom paints against fouling by marine organisms (marine grasses, algae and barnacles). When used in combination with conventional anti-fouling toxicants such as cuprous oxide and tributyltin fluoride it provides greatly improved fouling resistance.

100.2 Formulation Information

4,5-dichloro-2-n-octyl-3(2H)-isothiazolone ... 35%
4-chloro-2-n-octyl-3(2H)-isothiazolone 5%

INERT INGREDIENT INFORMATION IS NOT INCLUDED

Inert Ingredients



100%

*Trade secret

100.3 Application Methods, Directions, Rates

Sold for manufacturing use only.

100.4 Precautionary Labeling

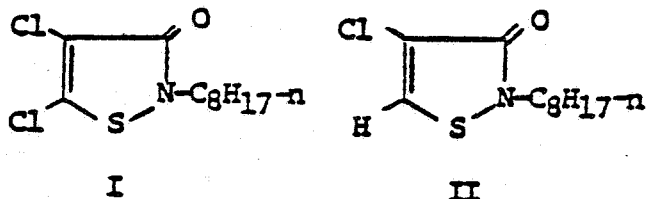
This pesticide is toxic to fish and wildlife. Do not discharge into lakes, streams, ponds or public waters unless in accordance with an NPDES permit. For guidance, contact your Regional Office of the EPA. Do not contaminate water by cleaning of equipment or disposal of waste. Apply this pesticide only as specified on this label.

101 Physical and Chemical Properties

101.1 Chemical Names

- I 4,5-dichloro-2-n-octyl-3(2H)-isothiazolone
- II 4-chloro-2-n-octyl-3(2H)-isothiazolone

101.2 Structural Formulae



101.3 Trade Names

I RH-25,287
II RH-40,085

101.4 Molecular Weights

I 282.24
II 249.79

101.5 Physical State

(of C-9211M)

Appearance:	Dark brown, mobile liquid
Odor:	Faint xylene odor
pH:	Not applicable
Specific Gravity:	1.03(41.5% a.i.; 20°C)
Viscosity:	6.4 cps (25°C)
Solubility:	Essentially insoluble in water, Miscible in most organic solvents
Flash Point:	87°

102 Behavior in the Environment

(Summarized from abstracts of unvalidated EAB studies, ACC. #249934)

The Migration of Antifouulant C-9211 M from Paint into Synthetic Sea Water

Two commercial antifouling paints, one containing tributyltin fluoride (TBTF) as the primary toxicant and the other cuprous oxide (Cu_2O), were each spiked with a representative level (3% a.i.) of C-9211 M. "The percentage loss of the major active ingredient over 32 days at 25° is about 0.6% for both paints. In the case of the minor active ingredient, the percentage loss is substantially greater (>10X), owing most probably to its higher water solubility (60 vs. 2.3 ppm)."

^{14}C -RH-5287 Activated Sludge Metabolism

^{14}C -RH-5287 was studied in a laboratory model activated sewage-sludge system. The test material was added to activated sludge and synthetic sewage, the concentration starting at 0.1 ppm and increasing daily for six days to 20 ppm. For the next seven days, the concentration added was 20 ppm. A 50 ppm shock treatment was included in the study for just one cycle. "Decreased microbial activity (plate counts, protozoa, starch and cellulose degradation) was observed in the 50 ppm treated flask. Bacteria counts were higher in the incrementally treated flasks than in the controls in cycles 5-13 (10-20 ppm), probably due to the absence of protozoa ... starch and cellulose degradation in the treated flasks remained at or above control levels until the 20 ppm addition, with degradation levels steadily decreasing for the remainder of the study".

¹⁴C-RH-5287 Hydrolysis Study

"The hydrolytic half-lives of ¹⁴C-RH-5287 at pH 5 and pH 9 was determined to be nine days and 12.5 days, respectively." "No hydrolysis products were found under neutral (pH 7) conditions."

¹ 4C-RH-0085 (4-chloro-2-(n-octyl)-3(2H)-isothiazolone) Hydrolysis Study



"No hydrolysis products were found in any of the buffers after 30 days incubation."

103 Toxicological Properties

103.1 References from Toxicology Branch

(The following information is taken from the Registrant's summary of toxicological data, p. 30, Acc. #249934).

Rat, Oral LD50:

1.89 (1.46-2.61) g/kg product; equivalent to 0.76 (0.58-1.04) g/kg a.i.

Rabbit, Dermal LD50:

1.7 (1.0-4.5) g/kg product; equivalent to 0.68 (0.4-1.8) g/kg) a.i.

Rabbit, Primary Skin Irritation:

Severe irritation (P.I.I. - 7.8)

Rabbit, Eye Irritation:

Severe irritation

Rat, Inhalation LC50:

0.72 (0.57-0.92) mg/l-4 hr. whole body exposure; equivalent to 0.29 (0.23-0.37) mg/l a.i.

103.2 Ecological Effects Data

Species LD50 (mg/kg) LC50 (ppb product) LC50 (ppb a.i.) Validation

Mallard	1. >4640			Core
Mallard		1. >10,000 (ppm)		Core
Bluegill			2. 29	Suppl.
Rainbow T.			2. 9.7	Suppl.
<u>D. magna</u>			2. 9.2	Core/Formula ^{Suppl.}
				lation (LN)
Bluegill		3. 22	3. 17	6. Suppl.
Rainbow T.		3. 10	3. 7.7	6. Suppl.
<u>D. magna</u>		3. 28	3. 21.6	Core

Sheepshead M.	4. 22	4.13.2	Core
Brown Shrimp	4. 16	4. 9.6	Core
E. Oyster	4. 9(EC50)	4. 5.4(EC50)	Core
Fiddler Crab	4. 1.7(ppm)	4. 1.0(ppm)	Suppl.
Bay Mussel		5. 850	Suppl.
Mussel, Embryo-larva		5. 1.9(EC50)	Suppl.
Marine alga			
cells	4. 18(EC50)	4. 10.8(EC50)	Suppl.
chlorophyll	4. 26(EC50)	4.15.6(EC50)	Suppl.

Footnotes:

1. RH-287 (60% a.i.); 4,5-dichloro-2-n-octyl-3(2H)-isothiazolone. (The main active ingredient of C-9211).
2. RH-287 (66% a.i.)
3. Technical (77.2%)
4. Technical (60%)
5. Biocide C-9211 (50%)
6. Possibly repairable to core upon receipt of additional information.

103.2.1 Avian Acute Oral LD50

This study is scientifically sound and indicates that RH-287 is practically non-toxic (acutely) to 14-day old mallard ducks. The study does fulfill the requirements for an avian acute oral LD50.

103.2.2 Avian Dietary LC50

This study is scientifically sound and indicates that RH-287 is practically non-toxic to mallard ducks when administered through the diet. The study does fulfill the requirements for an avian dietary LC50.

103.2.3 Fish Acute LC50's

Bluegill and Rainbow trout, RH-287

These studies are scientifically sound and indicate that RH-287 is very highly toxic to bluegill sunfish and rainbow trout. The studies would not fulfill a requirement for two 96-hour fish LC50's performed on the technical.

Bluegill and Rainbow trout, Technical material

These studies are scientifically sound and indicate that C-9211 is very highly toxic to bluegill sunfish and rainbow trout. However, the studies would not fulfill the requirements for two 96-hour fish LC50's unless it can be shown that the low oxygen levels reported did not significantly influence the results of the tests. Needed are data on the D.O. levels at each test concentration (including controls) at the beginning of the test, at 48 hours, and at 96 hours.

103.2.4 Aquatic Invertebrate LC50

Daphnia magna, RH-287

the study is scientifically sound and indicates that RH-287 is very highly toxic to Daphnia magna (at a dilution water temperature of 22°C). The study does fulfill a requirement for an aquatic invertebrate 48-hour LC50 performed on this product.

Daphnia magna, Technical material

The study is scientifically sound and indicates that C-9211 is very highly toxic to Daphnia magna (at a dilution water temperature of 22°C). The study does fulfill a requirement for an aquatic invertebrate 48-hour LC50.

103.2.5 Toxicity to Estuarine and Marine Animals

Sheepshead minnow

The study is scientifically sound and indicates that C-9211 is very highly toxic to sheepshead minnows. The temperature was maintained at 20°C rather than at 22°C as recommended. However, the study does fulfill the requirements for a marine fish 96-hour LC50.

Brown Shrimp

The study is scientifically sound and indicates that C-9211 is very highly toxic to brown shrimp. The study does fulfill the requirements for a shrimp acute 96-hour LC50, although the low dissolved oxygen levels noted in the test may have contributed to the observed mortality.

Eastern oyster

The study is scientifically sound and indicates that C-9211 is very highly toxic to embryos of the Eastern oyster. The study does fulfill the requirements embryo-larva study.

Fiddler crab

The study is scientifically sound and indicates that C-9211 is moderately toxic to fiddler crabs. The study does not fulfill any ecological effects data requirement because the fiddler crab is not a recommended species.

Bay mussel

The study is scientifically sound and indicates that Biocide C-9211 is very highly toxic to bay mussels. The study does not fulfill any ecological effects data requirements because the bay mussel is not a recommended species.

Bay mussel embryo-larva

The study is scientifically sound and indicates that Biocide C-9211 is very highly toxic to embryos-larvae of the bay mussel. The study does not fulfill the requirement for a mollusc 48-hour acute embryo-larva study because the bay mussel is not a recommended species.

103.2.6 Aquatic Phytotoxicity

The study is scientifically sound and indicates that C-9211 is very highly toxic to the marine alga Skeletonema costatum as indicated by a reduction in cell numbers and by a decrease of in vivo chlorophyll a.

104 Hazard Assessment

This product is sold for manufacturing use only. The user should consult Precautionary Labeling for guidance as to proper disposal.

105 Conclusions

105.1 Data Adequacy Conclusions

With the exception of the bluegill and rainbow trout LC50 studies, the data are adequate for registration of this manufacturing use product.

105.2 Data Requests

The bluegill and rainbow trout studies performed on technical C-9211 would fulfill the requirements for two fresh water fish LC50's only if it can be shown that the low dissolved oxygen levels reported did not significantly influence the results of the tests. The D.O. concentrations were given only as a range of values—from 81% to 17% in the bluegill study, and from 77% to 13% in the trout study. Needed are data on the D.O. levels at each test concentration (including controls) at the beginning of the test, at 48 hours, and at 96 hours.

105.3 Recommendations

EEB will not prescribe toxicity statements for Anti-Foulant C-9211 M (manufacturing use) until the information requested above is submitted and the fresh water fish studies are found to comply with guidelines requirements.

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