

US EPA ARCHIVE DOCUMENT

109702
SHAUGHNESSEY NO.

14
REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 12-18-83 OUT 3/2/84

FILE OR REG. NO. 10182-AL, 10182-AU, 10182-IN

PETITION OR EXP. PERMIT NO. _____

DATE OF SUBMISSION 12-8-83

DATE RECEIVED BY HED 12-14-83

RD REQUESTED COMPLETION DATE 3-4-84

EEB ESTIMATED COMPLETION DATE 2-29-84

RD ACTION CODE/TYPE OF REVIEW 106/New Chemical

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

DATA ACCESSION NO(S). _____

PRODUCT MANAGER NO. T. Gardner (17)

PRODUCT NAME(S) Cymbush 3E, Cymbush 2E, Cymbush OL

COMPANY NAME ICI Americas, Inc.

SUBMISSION PURPOSE Registrant response concerning aquatic field study

SHAUGHNESSEY NO. _____ CHEMICAL, & FORMULATION _____ % A.I. _____



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MEMORANDUM

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

TO: Tim Gardner, Team 17
Registration Division, TS-767c

THRU: David Coppage, Head Sec. 3 *DC*
Ecological Effects Branch
Hazard Evaluation Division, TS-769c

THRU: Clayton Bushong, Chief *McK for C13*
Ecological Effects Branch
Hazard Evaluation Division, TS-769c

SUBJECT: ICI's Response Concerning an Aquatic Field Study with Cymbush 3E,
Cymbush 2E, Cymbush OL; File Nos. 10182-AL, 10182-AU, and 10182-IN.

Cymbush is the trade name for cypermethrin. Based on laboratory data, cypermethrin is extremely toxic to aquatic organisms. LC₅₀'s ranges of 4-10 parts per trillion are not uncommon. Because of this and environmental fate data, aquatic benthic studies were requested.

ICI had submitted a field study. It was considered unsatisfactory to answer the benthic question. In the attached letter, ICI considers the field study and other submitted data show reasonable proof that adverse effects will not occur with cypermethrin, and request conditional registration on cotton.

In the interim, ICI has submitted a document "A Review of The Effects of Pyrethrum and Synthetic Pyrethroids On Non-Target Organisms in Terrestrial and Aquatic Environments" in lieu of a benthic field study. The study is being reviewed at present.

EEB defers action of the conditional registration of cypermethrin until this document is examined. Based on available data, adverse environmental effects can be anticipated with a cotton use.

Wayne C. Faatz, Ph.D. *Wayne C. Faatz*
Wildlife Biologist
Ecological Effects Branch
Hazard Evaluation Division, TS-769c

MAR 03 1984



ICI Americas Inc.

COPY 3

Agricultural
Chemicals
Division

HAND DELIVERED

December 8, 1983

Mr. Timothy A. Gardner
Product Manager (17)
Registration Division (TS-767C)
U.S. Environmental Protection Agency
Crystal Mall 2, Room 207
1921 Jefferson Davis Highway
Arlington, VA 22202

Dear Mr. Gardner:

RE: CYMBUSH® 3E Insecticide
File Symbol 10182-AL
CYMBUSH® 2E Insecticide
File Symbol 10182-AU
CYMBUSH® OL Insecticide
File Symbol 10182-IN
Response To Your Letter of 10/31/83
Request For Conditional Registration

In your letter of October 31, 1983 regarding the subject products, you stated that the request for a benthic study still remained. ICI believes that the aquatic field study and other aquatic data on cypermethrin submitted to date demonstrate that no severe effects upon aquatic ecosystems are likely to occur from the proposed uses on cotton. We thus believe that enough data have been submitted to support the registration of these products on cotton on the basis that resolution of this request is a condition of the registrations.

ICI therefore requests that conditional registrations be issued for the three products. ICI agrees to satisfy the request for the benthic study as a condition of the registrations.

Respectfully submitted,

Robert E Ridsdale

R. E. Ridsdale, PhD
Director

Registration & Regulatory Affairs

RER/mah
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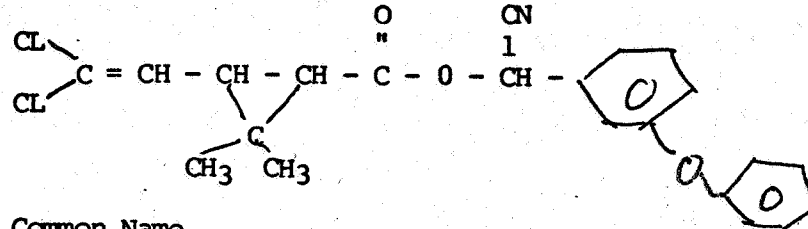
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102 Physical Chemical Properties

102.1 Chemical Name

(+) - cyano-3-(phenoxyphenyl) methyl (+) cis, trans
3-(2,2-dichloroethenyl)2,2-dimethyl cyclopropanecarboxylate

101.2 Structural Formula



102.3 Common Name

Cypermethrin

102.4 Trade Name

Cymbush 2E, Cymbush 3E, Cymbush OL

102.5 Molecular Weight : 416

102.6 Physical State

Dark brown viscous liquid

1,2.7 Properties

102.7.1 Solubility

Miscible with alcohols, ketones, chlorinated hydrocarbons and substituted aromatic hydrocarbons (xylene). Sparingly soluble in aliphatic hydrocarbons.

102.7.2 Octanol/Water Partition Coefficient.

Unknown

102.7.3 Soil Adsorption Coefficient K_d 2,000

102.7.4 Vapor Pressure 10-22 mm/Hg depending on formulation

103 Behavior in the Environment

103.1 Soil

	<u>Degradation</u>		
	<u>Laboratory</u>	<u>Field</u>	<u>Photolysis</u>
<u>Aerobic</u>	2-8 weeks	4-12 days	8-16 days
<u>Anaerobic</u>	ND	ND	

18301

August, 1981

COMPARATIVE TABLE OF THE FISH AND WILDLIFE TOXICOLOGICAL
* PROPERTIES OF FOUR SYNTHETIC PYRETHROIDS *

A. Yamhure

	PYDRIN (109301)	PAY-OFF <i>see exposure</i> (110301)	PERMETHRIN (109701)	TRALOMETHRIN HAG-107 (121501)
Rainbow trout	1= 6.2 ppb	1= 0.31 ppb	1= 9.8 & 2.11 ppb	1= 1.6 ppb
Channel catfish	1= 0.81 ppb	1= 0.51 ppb	1= 5.4 ppb	
Bluegill sunfish	1= 0.42 ppb	1= 0.70 ppb	1= 2.52 & 6.1 ppb	1= 4.3 ppb
Mosquito fish	72h-LC50 2.6 ppb			
<i>Mysidopsis bahia</i>	4= 0.008 ppb (EPA-GB)	1= 0.008 ppb (EPA-GB)	1= 0.02 ppb (EPA-GB)	
Sheepshead minnow	1= 5.0 ppb (EPA-GB) 290 ppb for 2.4 lb/gal.	1= 5.0 ppb 1.1 ppb (EPA-GB)		
Fathead minnow	1= Larvae - 0.43-0.33 ppb 2.1 ppb (EPA/DULUTH)	30-day early stage LC50 < 0.063 ppb	6= chronic MATC > 0.30 < 0.41 ppb Sign. reduct. fry 2.8 ppb - EPA-GB Permethrin	
Atlantic silversides (<i>Menidia menidia</i>)	0.31 ppb (EPA-Gulf Breeze)	1= 0.31 ppb	1= 2.3 ppb (EPA-GB)	
Pink shrimp	1= 0.28 ppb 1= 0.047 ppb (EPA DULUTH)	1= 0.22 ppb (EPA-GB) 0.354 & 0.5 ppb	1= 0.22 ppb (EPA-GB)	
<i>Gammarus</i> (amphipod)				
Eastern oyster: a) Adult b) Embriolarvae c) Shell deposit.		48hEC=31.0 ppb > or =12.0 ppb	1=>536 ppb (supp)	
Daphnia: a) Adult b) Life cycle	2= < 1.6 ppb	2= 8.3 ppb	2= 0.32 2= 39 to 80 ppt [1st. instar 48h 1.8 ppb]	NEL 48h=100ppt 2= 0.038 ppb
Fiddler crab			1= 2.39 & 7.60 ppb	
Mallard duck a) Adult 1- 2- b) Reproduct.	4=> 10,000ppm	4= 4,885 ppm 3= > 2,510 mg/kg 6= at 25/75/125 ppm no effects	4= 723,000 ppm 3= > 4,640 mg/kg	4= 7,716 ppm
Bobwhite quail a) Adult 1- 2- b) Reproduct.	4= 5,502 ppm	4= 3,335 ppm 3= 2,708 mg/kg same as mallard	4= > 9,869 ppm subact. 1=>10,000 ppm.	4= 4,301 pp act. 1= 72,510 ppm
Bee			9= 0.19ug/bee 10= 0.05ug/bee	5
Rat	3= 1.0 to 3.0 g/kg 5= 125 ppm	3= 67 to 81 mg/kg 5= 60 ppm NEL	3= 8.9g/kg 5= 2mg/kg NEL	3= 84 mg/kg 13d NEL=6mg

1= 96h LC50 shell deposition 2= 48h-LC50 3= LD50 Embryolarvae 4= 8 day feeding 5= 90 day feed Bee or rat 6= reproduct.

* COMPARATIVE TABLE OF CHEMICAL AND ENVIRONMENTAL FATE DATA FOR
FOUR NEW SYNTHETIC PYRETHROIDS *

A. Yambues

	PYDRIN (109301)	PAY-OFF (118301) 49 PPB	PERMETHRIN (109701) 50 PPB	TRALOMETHRIN HAG-107 (121501)
Water solubility- <i>applicant</i> <i>(Sea H₂O EPA-G.B. 24 PPB.)</i>	< 20 ppm (@20°C)	0.6 ppm (@21°C)	0.07-0.01 ppm	0.07ppb (20°C)
Molecular weight	419.9 C ₂₅ H ₂₂ ClNO ₃	451.4 C ₂₂ H ₂₃ O ₄ NF ₂	391.28 C ₂₁ H ₂₀ O ₃ Cl ₂	665.013 C ₂₂ H ₁₉ Br ₄ NO ₃
Empirical Formula				
Structural Formula				None @ pHs 3 & 7
Hydrolysis (half-life)	570 days @pH 7.2	51.7 days	Shade 3 wk Sunlight 4 days	
Photolysis <i>1/2t EPA 100 soil + 100 ml pesticide + Sea H₂O - Gulf Breeze</i>	51.8% gone in 28 days <i>34.0 days</i>	<i>16.0 days</i>	<i>< 2.5 days</i>	
Half-life (t 1/2) in: - water - soil <i>= soil photolysis</i>	30 days 12 to 54 days	52 days 90 days <i>22 days</i>	79 days @pH 7 28 days to 10wk.	>30 days 20 to 40 days
Leaching	Immobile	Immobile (Cl-1)	Immobile	Immobile Kads > 200 or high Desorbs HI pt
Bioaccumulation in: - Rainbow trout - Catfish - Bluegill sunfish - Fathead minnow	<i>EPA ESTIMATED 4,700X</i> 400X 490X	<i>EPA ESTIM. 2,300X</i> (1d.) MAX. (30d) 720X-2,490X 546X	<i>EPA ESTIM. 1,900X</i> 95X 47X 4700X	
Octanol/water Partition coefficient	<i>[K_{ow}] = 0.14 - 0.15 = 1600X</i> <i>10/1 = 0.19 - 0.14 = 4600X</i> <i>EPA-Gulf Breeze</i> 6.2	<i>EPA-Gulf Breeze</i> 6.2	<i>EPA-Gulf Breeze</i> 6.5	
Estimated concentrat. - 1A x 4 ft. lake - 3A x 15 ft " - 10A x 20 ft " - 3A x 4-6 ft "	8x10 ⁻⁴ ppm 2.5x10 ⁻⁴ ppm 8x10 ⁻⁵	6 ppm EFB's 0.5 ppm-hydroso.		
Max. applicat. rates Max. No. of applicat. Uses (actual or proposed):	0.3 lbs.ai/A 15/season 5 mo. Tomatoes; apples; plum; cabbage; co- rn; pears; beans;	0.078 lbs.ai/A 10 /season 5mo. Cotton	0.2 lbs.ai/A 15/season 5mo. Cotton; celery; tomatoes; potato- es; alfalfa; cel.	0.2 lbs.a 15/season Cotton
Results from field studies:		Spray drift stu- dies showed adv- erse effects on fish at 50 ft and none beyond.		

* G.B. = EPA's
BREEZE Lab