Shauc	hnessy	No.	107401						,
Chemi	cal	1	D.C. 5700	•			· · · · · · · · · · · · · · · · · · ·		
EEB F	ile Re	viewed fo	r Supportive F &	W Studi	es:			Ch nh	Major
	Test	Material	Species	Test	IBT	Test #	Valid	Status Invalid	IBT Gap
. ,									Gap
	?	િક	Bluegill Sunfish	LC50		A-1904		x	Xt
	?	8	Rainbow Trout	LC50		A-1904		x	Xt

Uses:

Industrial preservative finish for textiles.

Data Gaps: Missing valid studies for all six basic Fish and Wildlife tests

	Techi	nical	Powe		Formula Gran		Conce	ntrate
Six Basic Studies		Major					COIICE	ictace
on Technical Material	Have	Data Gap	Have	Data Gap	Have	Data	Have	Data
Avian Acute Oral LD50		Gap		Gap		Gap		Gap
Avian Upland Game LC50								
Avian Waterfowl LC50			***********	7**,***,**	·		********	
Warm-water Fish LC50		<u>x</u>			**********			
Cold-Water Fish LC50		X					. 	
Aquatic Invert. EC50								
				 			-	
Additional Studies:								
Estuarine Fish LC50								
Estuarine Shrimp EC50				****				
Molluscan Larvae EC50								
Shell Deposition EC50		·						
Estuarine Algae EC50 Fish Accumulation				· · · · · · · · · · · · · · · · · · ·				
Avian Accumulation								
Avian Accumulation								
Avian Field Study								
Upland Game Species								
Waterfowl Species				-		·		
Avian Reproduction								-
Upland Game Species				•				
Waterfowl Species								

[†] We suggest that the replacement studies for these two fish studies be conducted on the technical material, rather than the formulated product.

Reviewer:

William S. Rabert, Biologist
Ecological Effects Branch, HED

1

Data Evaluation Record

1. Chemical: TX-793 or Dow Corning X-9-5700

(3- (Trimethoxysilyl)propyl dimethyl octadecyl ammonium chloride)

2. Formulation: Unknown

3. <u>Citation</u>: Report to Dow Corning Corporation - Four Day Static Fish Toxicity Studies with Tx-793 in Rainbow Trout and Bluegills; IBT Report A-1904 submitted 9/29/72.

4. Reviewed By: T. B. Johnston
Biologist, EEB/HED
June 18, 1980

5. Test Type: 96-hr LC50s to rainbow trout and bluegill sunfish

6. Reported Results: The 96-hour LC50 of TX-793 (also known as Dow Corning X-9-5700 and 3-(Trimethoxysilyl)propyl dimethyl octadecyl ammonium chloride) was 0.56 ppm for rainbow trout, and 0.51 ppm for bluegill sunfish.

7. Reviewer's Conclusions: The studies are not scientifically sound and do not fulfill the requirements for acute toxicity tests on coldwater and warmwater fish.

Materials/Methods

Protocol generally followed EPA guidelines, but several important deviations were noted. First, the control and solvent control tests were run on the earlier than the toxicant tests. Therefore, test and control animals could not have been randomly chosen from the same population. Second, the raw data sheets showed 10% mortality among the rainbow trout controls, and 70% mortality among the bluegill solvent controls, but these data went unmentioned in the final report. Apparently IBT simply ignored any results that were inconvenient. Third, IBT used polyethylene liners in all test chambers. Many toxicants can adsorb to polyethylene surfaces, reducing the actual test concentrations well below the nominal levels. Where such bags are used, the Agency requires post-test measurements of the actual toxicant concentrations. There is no indication in the reports that such measurements were made.

Statistical Analysis

The LC50s, and 95% confidence limits were calculated according to the methods of Litchfield Wilcoxon. This reviewer's analysis (by the Finney probit method) gives slightly different results when applied to the final report data.

Apparently, an error was made during the transfer of trout mortality data from the raw data sheets to the final report tables. The raw data sheets are difficult to read, but they appear to indicate only 4 trout mortalities at the 0.56 ppm level, rather than the 5 that were reported.

Results/Discussion

Concentration (ppm)

No. Mortalities/No. in Group

Rainbow Trout

Control Solvent control		0/10 (2 / 20*) Not given (0/10*)
0.10		0/10
0.18		2/10
0.32		1/10
0.56	B	5/10 (4/10*)
1.00		10/10

LC50 = 0.56 ppm (95% C.I. = 0.34 - 0.92 ppm)LC50 = 0.50 ppm** (95% C.I. = 0.36 - 0.73 ppm)**

Bluegil1

Control Solvent control	0/10 Not given (7/10*)
0.10	0/10
0.18	1/10
0.32	1/10
0.56	6/10
1.00	10/10

LC50 = 0.51 ppm (95% C.I. = 0.38 - 0.69 ppm) LC50 = 0.46 ppm** (95% C.I. = 0.35 - 0.62 ppm)**

*As recorded on raw data sheets
**As calculated by the reviewer from data on raw data sheets.

Reviewer's Evaluation:

Validation Category: Invalid Category Nationale: The test substance may have adsorbed to the polyethylene liners used in the test vessels. Such adsorption could reduce toxicant concentrations in the test vessels to levels well below the nominal concentrations given. Also, IBT (the testing lab) used fish from different groups for the control, solvent control, positive control, and toxic materials tests. Good laboratory practice demads that control and experimental animals be randomly selected from a single group.

Category Repairability: The trout test may be upgraded to Supplemental if the laboratory can show evidence that they measured ambient toxicant levels in each test vessel at the conclusion of each test, and that these levels approximated the nominal concentrations. The test cannot be upgraded to Core because the control and experimental fish were not taken from the same group.

The bluegill test may not be upgraded, because 70% of the solvent control fish died. Such a high mortality rate among control animals indicates problems with test conditions, water quality, and/or the fish themselves.

r '	EVECTED	10	100	9.76563E-2
.—	10 ·		50	62.3047
.56 .32	10 10) 1 •	10.	1.07422
.18	10	2	20.	5.46875
.10	10	ñ	Ω.	9.76563E-2
• 4	TO		Δ.	
THE BINOMIAL T	דכי בארשכ ייאאיי	.1 AND 1	ישם זוגיי	6-HR LC50
	TICALLY SOUND C	• •••	P A	INBOW TROUT TEST
	ITS SINCE THE A			T ROPERT A-1904
	H THESE LIMITS			
1100,70111120 11111		LD ONDITER I		2/28/72
•			(REPOR	TED MORTALITIES
AN APPROXIMATE	LC50 FOR THIS	SET OF DATA	IS .56	102 102111021125
,				USED)
•	• :	•		• • • • • • •
RESULT	S CALCULATED US	ING THE MOVI	NG AVERAGE METH	OD
SPAN	G	LC50		CONFIDENCE LIMITS
3	.218715	(.493996)	.363545	.731881
• •			_	
•	•			
RESULT	S CALCULATED US	ING THE PROB	IT METHOD	
ITERATIONS	G	H		FIT PROBABILITY
6	.226161	1	9.14559E-2	
SLOPE =	3.67321	•	•	
95 PERCENT CON	FIDENCE LIMITS	= 1.92637	AND 5.42006	•
		•	•	
LC50 = .	(.466178)			
95 PERCENT CON	FIDENCE-LIMITS	= .344017	AND .663	
*****	*****	*****	*****	*****
• -				DIMONIAL
CONC.	NUMBER	NUMBER	PERCENT	BINOMIAL
	EXPOSED	DEAD	DEAD	PROB. (PERCENT) : 9.76563E-2 :
1	10	10	100	37.6953
.56	10	4	40. 10.	1.07422
.32	10 10	<u> </u>	20.	5.46875
.18	10		0	9.76563E-2
• 1	.10	U	V	
מטט פראוראדאד י	TEST SHOWS THAT	.1 AND 1	CAN BE · 96	-HR LC50
THE DINUMIAN.	TEST SHORS THAT		· · · · · · · · · · · · · · · · · · ·	NBOW TREAT TEST
CONDIDENCE III	MITS SINCE THE	ACTUAL CONFTI		
ACCULTABLE DIE	TH THESE LIMITS	TS GREATER '	THAN 95 PERCENT	TREPORT A-1964
ADDUCTATED HI.	IN THEOD DINETO	to didition .		2/29/72
• _	•		(RAW	PATA SHEET MURTALITIES
AN ADDROXIMAT	E LC50 FOR THIS	SET OF DATA	IS .602724	
AR ALLKONIIII	g 2000 10tt zmzp			usip)
		•	•	
PRESIII.	TS CALCULATED U	SING THE MOV	ING AVERAGE MET	HOD ·
SPAN	G .	LC50	95 PERCENT	CONFIDENCE LIMITS
3	.218109	.52307	.387217	.795134
		4		
	•	. •		
RESUL	TS CALCULATED U	SING THE PRO	BIT METHOD	
ITERATIONS	G		GOODNESS O	F FIT PROBABILITY
6	.236619	H 1	5.63889E-	2
•			•	
SLOPE =	3.50858			
95 PERCENT CO	NFIDENCE LIMITS	= 1.80188	AND 5.2152	8
<u> </u>				, , ·
LC50 =	(.496139)		•	4
	NFIDENCE LIMITS	= .36379	2 AND .72	6713
		بقائلت بالاستاف الاستاف بالاستاف بالاستاف بالاستاف	للم الله الله الله الله الله الله الله ا	

cont.	NUMBER	NUMBER -	PERCENT	BINOMIAL
	EXPOSED	DEAD	DEAD	PROB. (PERCENT)
1	10	10	100	9.76563E-2
.56	10	5	50	62.3047
.32	10	1	10.	1.07422
.18	10	2	20.	5. 46875
.1	10	ō	0	9.76563E-2
<u> </u>	. 20	2	10	•
0	. 20		96-HR	LC50
AN APPROXIMATE	LC50 FOR THE	S SET OF DATA	IS .56 RAPNBON	TRUNT TEST
		- 3 33m 3	CAN BE TBT RE E 95 PERCENT 2	PURT A-1969
THE BINOMIAL T	EST SHOWS THA	T .1 AND	CAN BE 2	/24/72
USED AS STATIS	TICALLY SOUNI	CONSERVATIVE	S 95 PERCENT	MURTAL PTERS
CONFIDENCE LIM	ITS SINCE THE	E ACTUAL CONFI	DENCE LEVEL (LIPURI	is a armit
- ASSOCIATED WIT	H THESE LIMI	rs is greater	THAN 95 PERCENT.	Olich album about
•				CURRECTION FOR
•				CONTROL MORTALITY
RESULT	S CALCULATED	USING THE MOY	VING AVERAGE METHO	OD
SPAN	G	LC50	95 PERCENT (CONFIDENCE LIMITS
3	.218715	(.493996)	.363545	.731882
	•			
			•	
RESULT	S CALCULATED	USING THE PRO	OBIT METHOD	
ITERATIONS	G	H	CHI-SQUARE	PROBABILITY
6	.226161	ī	6.45496	9.14559E-2
		. •	•	•
SLOPE =	3.67321	•		•
95 PERCENT CON		TS = 1.92637	AND 5.42006	
95 PERCENT CON	FIDENCE DIME	10 - 11,72,007		•
**************************************	.466178	•	•	.*
LC50 =	TOULIO /	TS = .3440	17 AND .663	01
95 PERCENT CON	LIDENCE FIMI	19 - •3440		
•	•	••	g	· · · · · · · · · · · · · · · · · · ·
	******	*****	ΑΛΑΛΑΛΑΛΑΑ	•
ΑΑΑΑΑΑΑΑΑΑΑΑΑΑΑ	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA		TTVE VERSTON	

RESULTS USING ABBOTT'S FORMULA----TENTATIVE VERSION----

CONTACT CHARLES STEPHAN IF YOU HAVE QUESTIONS OR COMMENTS

CONC.	NUMBER . EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1	• 9	9	100	.195313
.56	q	4	44.4444	50
.32	á ·	, o	· 0	.195313
.18		• 1	11.1111	1.95313
• 10	0	Î	-11.1111	0
• +	20	- 2	10.	

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS (.584751

.32 AND THE BINOMIAL TEST SHOWS THAT USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS SINCE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

THE MOVING AVERAGE METHOD CANNOT BE USED WITH THIS SET OF DATA BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

THE PROBIT METHOD PROBABLY CANNOT BE USED WITH THIS SET OF DATA SINCE CONVERGENCE WAS NOT ACHIEVED IN 100 ITERATIONS.

COMPARE ALL RESULTS WITH ORIGINAL DATA TO BE SURE THE RESULTS ARE REASONABLE.

an a	NUMBER	NUMBER.	PERCENT	DINUNIAL P
CONG.	•	DEAD	DEAD	PROB. (PERCENT)
	EXPOSED	10	100	9.76563E-2
. 1	10	10	40.	37.6953
.56	10	1	10.	1.07422
.32	. 10	2	20.	5.46875
.18	10	2	0	9.76563E-2
.1	10	Ŭ	3.0	
0	20	2		-HR LC50
AN APPROXIM	TATE LC50 FOR TH	IS SET OF DATA	IS .602724 PATA	DOW TRUIT FIST
MI III I I I I I I I I I I I I I I I I			18T	REPORT A-1404
THE BINOMIA	L TEST SHOWS TH	AT .1 AND 1	CAN BE	2/24/72
			95 PERCENT	DATA CHUET
ACMUST DOMAD	TTUTME CTMER TI	IP ACTUAL CONFI	DENCE LEVEL C	PATA SHEET
ASSOCIATED	WITH THESE LIMI	TS IS GREATER		
ADDOCIMIED	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	•		-1152190 1400-11 1
	• •		·COCF	ECTION FOR CONTROL
RES	SULTS CALCULATED	USING THE MOV	ING AVERAGE METH	OD MERTALETTES
SPAN	G	LC50	95 PERCENT	CONFIDENCE PINITIS
3	.218109	.523071		.795134
.3	. 210103		, ,	
•	•			
	SULTS CALCULATED	DISTNO THE PRO	BIT METHOD	
	G CALCULATE	H	CHI-SQUARE	. PROBABILITY
ITERATIONS	.236619	1	7.54597	5.63891E-2
7	. 230019	•		
Gronn -	3.50858			•
SLOPE =	CONFIDENCE LIM	rms = 1.80188	AND 5.21528	
95 PERCENT	CONFIDENCE DIM.	110 - 1.00100		•
	406120	•		
LC50 =	496139)	ITS = .36379	2 AND .726	5713
95 PERCENT	CONFIDENCE LIM	110 - 120212		
	•	•		•
		******	Δααααααα	
AAAAAAAAA	AAAAAAAAAAAAAA	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	TTTP VEDSTON	
RESULTS US	ING ABBOTT'S FO	KWODAIDNIAI	IVE VERSION	ng
	ARLES STEPHAN I	F YOU HAVE QUES	TIONS OR COMMENT	BINOMIAL
CONC.	NUMBER	NUMBER	DEAD	PROB. (PERCENT)
•	EXPOSED	DEAD	100	.195313
1	9 /	9		25.3906
.56	9	3	33.3333	.195313
.32	9	0	0	
.18	9 .	• 1	11.1111	1.95313

-11.1111

10.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS

20

.1

THE BINOMIAL TEST SHOWS THAT AND 1 CAN BE .32 USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS SINCE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

THE MOVING AVERAGE. METHOD CANNOT BE USED WITH THIS SET OF DATA BECAUSE NO SPAN WHICH PRODUCES MOVING AVERAGE ANGLES THAT BRACKET 45 DEGREES ALSO USES TWO PERCENT DEAD BETWEEN 'O AND 100 PERCENT.

THE PROBIT METHOD PROBABLY CANNOT BE USED WITH THIS SET OF DATA SINCE CONVERGENCE WAS NOT ACHIEVED IN 100 ITERATIONS.

COMPARE ALL RESULTS WITH ORIGINAL DATA TO BE SURE THE RESULTS ARE REASONABLE.

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CONC. 11 .56 .32 .18	NUMBER . EXPOSED 10 10 10 10	•	NUMBER DEAD 10 6 1	PERCENT DEAD 100 60. 10.	BINOMIAL PROB. (PERCENT) 9.76563E-2 37.6953 1.07422 1.07422 9.76563E-2
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THE BINOMIAL TEST SHOWS THAT .32 AND 1 CAN BE 96-HR LC56
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT BLUEGIL SUNFISH TIST
CONFIDENCE LIMITS SINCE THE ACTUAL CONFIDENCE LEVEL FBT REPORT A-1964
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

2/29/72

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .505705

			•	*
	RESULTS_CALCULATED	HISTNG THE MOUTNO	AUPDACE MERIOS	
CDAN		ODING THE MOVING		
SPAN	G	LC50 (.476606)	95 PERCENT CONFIDEN	TE TEMPE
3	.170737	(A76606)		
•		(.4/0000)	.363493 .65	6191

TERATIONS G H GOODNESS OF FIT PROBABILITY

7 .234863 1 .297866

SLOPE = 4.69405 95 PERCENT CONFIDENCE LIMITS = 2.41918 AND 6.96891

LC50 = (.46382 95 PERCENT CONFIDENCE LIMITS = .352798 AND .620211