DATA EVALUATION

CHEMICAL: Cypermethrin

FORMULATION: 91.5 % active ingredient (Technical grade)

CITATION: Jaber, M.J. (1981) the acute toxicity of cypermethrin
to Pink Shrimp (Penaeus duorarum) Unpublished report by
EG&G Bionomics, Inc. and submitted 12/28/81 by ICI
Americas Inc., Wilmington, Delaware. MRID 00079043

EPA Accession No. 070562

REVIEWED BY: Thomas B. Johnston
Biologist, EEB/HED

REVIEW DATE: April 12, 1982

TEST TYPE: Acute flow-through toxicity test

REPORTED RESULTS: The reported 24, 48, 72, and 96-hr LC_{50}s of
cypermethrin for pink shrimp were 74, 43, 38,
and 36 pptr, respectively.

REVIEWER'S CONCLUSIONS: This study is scientifically sound, and
fulfills USEPA guideline requirements for
an acute 48-hr toxicity test using an
estuarine invertebrate. With a 48-hr*
LC_{50} of 43 pptr, cypermethrin is very   note change below
highly toxic to pink shrimp.

ADDENDUM

Reviewed by: Ann Stavola
Aquatic Biologist
EEB/EFED   1/4/91

Reviewer's Conclusions: The study is scientifically sound and fulfills EPA's requirements
for an acute toxicity study with an estuarine invertebrate. With
a 96-hr*LC50 value of 36 (31-43) pptr, technical cypermethrin is
very highly toxic to juvenile pink shrimp (Panaeus duorarum).

MATERIALS/METHODS

Methods used generally followed USEPA guidelines. Tests were run at 25°C and 27 ppt salinity. Duplicates of each concentration were run, with 10 shrimp per duplicate.

STATISTICAL ANALYSES

Data were analyzed according to the methods of Stephan (USEPA Duluth laboratory analysis program).

RESULTS

Mean Measured Concentrations (pptr)	No. Dead/No. Exposed			
	24 hrs	48 hrs	72 hrs	96 hrs
94	20/20	20/20	20/20	20/20
58	2/20	10/20	15/20	17/20
25	0/20	1/20	1/20	1/20
12	0/20	0/20	0/20	0/20
8.6	0/20	0/20	0/20	0/20
Solvent Control	0/20	0/20	0/20	0/20
Control	0/20	0/20	0/20	0/20
LC_{50}s	74 pptr	43	38	36
95% conf. limits	(58-94 pptr)	(36-53)	(32-46)	(31-43)

CONCLUSIONS:

Validation Category: Core

Category Rationale: N/A

Category Repairability: N/A

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JOHNSTON   CYPERMETHRIN   STATIC ACUTE 72HR LC50 PINK SHRIMP
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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
94	20	20	100	9.53674E-05
58	20	15	75	2.06947
25	20	1	5	2.00272E-03
12	20	0	0	9.53674E-05
8.6	20	0	0	9.53674E-05

THE BINOMIAL TEST SHOWS THAT 25 AND 58 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 44.1572

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	.0352127	38.4807	32.3759	46.9475

NO CONVERGENCE IN 25 ITERATIONS.   THE PROBIT METHOD
PROBABLY CANNOT BE USED WITH THIS SET OF DATA.

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JOHNSTON   CYPERMETHRIN   STATIC ACUTE 48HR LC50 PINK SHRIMP
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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
94	20	20	100	9.53674E-05
58	20	10	50	58.8098
25	20	1	5	2.00272E-03
12	20	0	0	9.53674E-05
8.6	20	0	0	9.53674E-05

THE BINOMIAL TEST SHOWS THAT 25 AND 94 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	.0396894	43.6168	36.1065	54.8364

NO CONVERGENCE IN 25 ITERATIONS.   THE PROBIT METHOD
PROBABLY CANNOT BE USED WITH THIS SET OF DATA.

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JOHNSTON 3-PHENOXYBENZOIC ACID STATIC ACUTE 24HR LC50 BLUEGILL
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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
52.7	20	20	100	9.53674E-05
44.6	20	5	25	2.06947
28.8	20	0	0	9.53674E-05
16.8	20	0	0	9.53674E-05
9.3	20	0	0	9.53674E-05
5.7	20	0	0	9.53674E-05

THE BINOMIAL TEST SHOWS THAT 44.6 AND 52.7 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 46.6479

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE
PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR
THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

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JOHNSTON CYPERMETHRIN PINK SHRIMP ACUTE 96HR LC50
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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
94	20	20	100	9.53674E-05
58	20	17	85	.128841
25	20	1	5	2.00272E-03
12	20	0	0	9.53674E-05
8.6	20	0	0	9.53674E-05

THE BINOMIAL TEST SHOWS THAT 25 AND 58 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 40.9497

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	.03336	36.4517	30.8579	43.9718

NO CONVERGENCE IN 25 ITERATIONS. THE PROBIT METHOD
PROBABLY CANNOT BE USED WITH THIS SET OF DATA.

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