Λ-cyhalothrin

Toxicity Data Summary

Hyalella azteca

Picard CR. 2010c. 10-Day toxicity test exposing freshwater amphipods (Hyalella azteca) to λ-cyhalothrin applied to formulated sediment under static-renewal conditions. Springborn Smithers Laboratory Study No. 13656.6132, Wareham, MA. Submitted to pyrethroid working group. DPR record number 254440.

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Parameter	**Value**	**Comment**
Test method cited	Springborn Smithers Laboratories Protocol No.: 100808/OPPTS/10-day Hyalella/artificial sediment.	USEPA
Phylum	Not stated	
Class	Not stated	
Order	Not stated	
Family	Not stated	
Genus	*Hyalella*	
Species	*azteca*	
Family in North America?	yes	
Age/size at start of test/growth phase	8 day old	
Source of organisms	Springborn Smithers lab culture	
Have organisms been exposed to contaminants?	No	
Animals acclimated and disease-free?	Yes	48 h
Animals randomized?	Yes	
Test vessels randomized?	Not stated	
Test duration	10 day	
Data for multiple times?	No	10 day only
Effect 1	Mortality	
Control response 1	93% neg control/94% solvent control survival	Pooled control 93%
Effect 2	Growth	
Control response 2	0.09 mg negative control and 0.07 mg solvent control	Pooled control = 0.08 mg
Effect 3	Not stated	
Control response 3	Not stated	
Temperature	24 to 25 ℃	
Test type	Static renewal	50 mL/cycle;7 cycles per day
Photoperiod/light intensity	16 h/8 h dark; 520-780 lux	
Dilution water (overlying water)	Well water	
pH	6.7-6.9	7.1-7.4 during test
Hardness	70 - 72 mg/L as $CaCO_3$	60-68 during test
Alkalinity	22 – 23 mg/L as $CaCO_3$	24-32 during test
Conductivity	390-460 µmhos/cm	350-390 during test
Dissolved Oxygen	6.5 – 8.0 mg/L	
TOC/DOC	0.54 mg/L/Not stated	
Ammonia-N	<0.01 – 0.30 mg/L	0.31-0.4 @ d0 <0.1 – 0.52 d10
Chemical analysis?/ Method	No	
Sediment formulated?	Yes	Method: OECD 218
Organic carbon	2.4%	
Particle size distribution (sand,	84%, 1%, 15%	

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silt, clay)		
pH	6.8	
Percent solids	59.01%	
Sediment spike procedure	Jar rolling technique	4 h @ RT; 15 rpm
Sediment spike equilibration time	14 d @ 2 - 8℃	Mixed 2x/week for 2 h @ RT
Sediment to Solution ratio	100:175 mL	100 mL sediment = 147 g wet wt or 86.7 g dry wt
Pore Water monitored?	Yes	Results in supplemental report; not referenced
Pore water extraction method	Centrifugation	1200 *g* 15-30 min
Pore water chemical extraction	SPME	
Pore water chemical analysis	Not stated	
pH	6.7-7.0	6.9 – 7.2 during test
TOC	130-180 mg C/L	140 -180 during test
DOC	98-140 mg C/L	110-150 during
Ammonia-N	1.4-5.1 mg/L	1.1-2.8 during
Redox	160-180 mV	180-190 during
Feeding	1 mL of YCT daily	Per replicate vessel
Purity of test substance	90.7%	
Concentrations measured?	Yes	
Measured is what % of nominal?	91.7±7.18% in formulated sediment spikes	89.1-153% in stock solutions
Toxicity values calculated based on nominal or measured concentrations?	Measured	
Chemical method documented?	Yes	Solvent Ext/ SPE cleanup and GCMS-NCI analysis
Concentration of carrier (if any) in test solutions	0%	10 mL of acetone evaporated from sand
Concentration 1 Nom/Meas (µg/kg)	0.25/0.31	9 Reps and 10 per (cell density for single-celled organisms):
Concentration 2 Nom/Meas (µg/kg)	0.5/0.44	8 Reps and 10 per
Concentration 3 Nom/Meas (µg/kg)	1.0/0.94	8 Reps and 10 per
Concentration 4 Nom/Meas (µg/kg)	2.0/1.8	8 Reps and 10 per
Concentration 5 Nom/Meas (µg/kg)	4.0/3.7	8 Reps and 10 per
Concentration 6 Nom/Meas (µg/kg)	8.0/6.0	8 Reps and 10 per
Control	Solvent and negative controls	8 Reps and 10 per
LC50	2.7 (2.3-3.1)95%CI	Method: Spotaneous Log –log analysis using TOXSTAT
EC50	1.4 (1.0 – 2.2)95% CI	Method: Linear interpretation method;

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Parameter	**Value**	**Comment**
NOEC	Survival: 0.94 Growth: < 0.31	Method: Bonferroni's T test; TOXSTAT program p: 0.05 MSD:
LOEC	Survival: 1.8 Growth: 0.31	Same as above
MATC (GeoMean NOEC,LOEC)	Survival: 1.3; growth: not able to calculate	
% of control at NOEC	(81%/93%=87%); not able to calculate for growth	Pooled controls
% of control at LOEC	(56/93=60%);(0.05/0.08=62%)	Pooled controls

Notes:
Protocol adapted from: USEPA, 2000. Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates. Protocol fulfills requirement of USEPA OPPTS 850.1735 Whole sediment acute toxicity invertebrates, freshwater (USEPA, 1996).

Although the study states pore water results are in a supplemental report, the data was never made available due to analytical and sample holding time issues.