aquatic bioassay & consulting laboratories, inc

March 28, 2016

Mr. Jay Rao
DCOR
290 Maple Ct., Suite 290
Ventura, CA 93003

Dear Mr. Rao:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA/R-95/136*. Results were as follows:

CLIENT:	DCOR
SAMPLE I.D.:	Platform Edith
DATE RECEIVED:	3 March - 2016
ABC LAB. NO.:	DCO0316.012

CHRONIC TOPSMELT SURVIVAL & GROWTH BIOASSAY

IWC = 12,544.8:1

TST RESULT

SURVIVAL	PASS
GROWTH	PASS

Yours very truly,

Scott Johnson
Laboratory Director

TST Summary Sheet

Lab Name	Aquatic Bioassay Labs.	**Client Name**	DCOR
Test ID	Platform Edith	**Test Species**	*A. affinis (topsmelt)*
Test Date	3/4/2016	**Test Type**	Chronic
Test Duration	7 days	**Endpoint**	Survival
Critical Conc.	0.00797%		

Statistic	Control	Critical Concentration
Percent Mean of Raw Data	1.00	1.00
Mean used in Calcuation (transformed)	1.35	1.35
Variance used in Calcuation (transformed)	0.000	0.000
Standard Deviation of Transformed Data	0.000	0.000
CV of Transformed Data	0.000	0.000
n	5	5

Mean % Effect at Critical Conc.

0.00

Calculated t-value	Degrees of Freedom	Table t-value	Percent Difference
			0.00000

Results

Pass Sample is Non-toxic

Raw Data

Control Data		Critical Concentration Data	
No. of Organisms Exposed or Counted	Response (Final Count, Weight, Length, etc.)	No. of Organisms Exposed or Counted	Response (Final Count, Weight, Length, etc.)
5	5	5	5
5	5	5	5
5	5	5	5
5	5	5	5
5	5	5	5

TST Summary Sheet

Lab Name	Aquatic Bioassay Labs.	**Client Name**	DCOR
Test ID	Platform Edith	**Test Species**	*A. affinis (topsmelt)*
Test Date	3/4/2016	**Test Type**	Chronic
Test Duration	7 days	**Endpoint**	Survival
Critical Conc.	0.00797%		

Statistic	Control	Critical Concentration
Percent Mean of Raw Data	0.24	0.28
Mean used in Calcuation (transformed)	0.51	0.56
Variance used in Calcuation (transformed)	0.002	0.001
Standard Deviation of Transformed Data	0.048	0.030
CV of Transformed Data	0.094	0.054
n	5	5

Mean % Effect at Critical Conc.

-20.00

Calculated t-value	Degrees of Freedom	Table t-value	Percent Difference
8.6550	7	0.7111	

Results

Pass Sample is Non-toxic

Raw Data

Control Data		Critical Concentration Data	
No. of Organisms Exposed or Counted	Response (Final Count, Weight, Length, etc.)	No. of Organisms Exposed or Counted	Response (Final Count, Weight, Length, etc.)
5	0.968	5	1.598
5	1.032	5	1.508
5	1.232	5	1.256
5	1.492	5	1.338
5	1.176	5	1.38

CETIS Summary Report

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	03-7290-9120	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	04 Mar-16 10:52	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	11 Mar-16 10:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	19-6943-7349	**Code:**	DCO0316.012tops	**Client:**	DCOR, LLC.
Sample Date:	03 Mar-16 07:00	**Material:**	Sample Water	**Project:**	
Receive Date:	03 Mar-16 12:30	**Source:**	Bioassay Report		
Sample Age:	28h (6.8 °C)	**Station:**	Platform Edith		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
11-2592-9743	7d Survival Rate	0.01594	>0.01594	NA	NA	6274	Steel Many-One Rank Sum Test
04-1618-6991	Mean Dry Biomass-mg	0.01594	>0.01594	NA	17.2%	6274	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
04-9832-0951	7d Survival Rate	EC5	>0.01594	N/A	N/A	<6274	Linear Interpolation (ICPIN)
		EC10	>0.01594	N/A	N/A	<6274	
		EC15	>0.01594	N/A	N/A	<6274	
		EC20	>0.01594	N/A	N/A	<6274	
		EC25	>0.01594	N/A	N/A	<6274	
		EC40	>0.01594	N/A	N/A	<6274	
		EC50	>0.01594	N/A	N/A	<6274	
18-3029-4733	Mean Dry Biomass-mg	IC5	>0.01594	N/A	N/A	<6274	Linear Interpolation (ICPIN)
		IC10	>0.01594	N/A	N/A	<6274	
		IC15	>0.01594	N/A	N/A	<6274	
		IC20	>0.01594	N/A	N/A	<6274	
		IC25	>0.01594	N/A	N/A	<6274	
		IC40	>0.01594	N/A	N/A	<6274	
		IC50	>0.01594	N/A	N/A	<6274	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
04-9832-0951	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
11-2592-9743	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
04-1618-6991	Mean Dry Biomass-mg	Control Resp	1.18	0.85 - NL	Yes	Passes Acceptability Criteria
18-3029-4733	Mean Dry Biomass-mg	Control Resp	1.18	0.85 - NL	Yes	Passes Acceptability Criteria
04-1618-6991	Mean Dry Biomass-mg	PMSD	0.1717	NL - 0.5	No	Passes Acceptability Criteria

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	1	1	1	1	1	0	0	0.0%	0.0%
0.00399		5	1	1	1	1	1	0	0	0.0%	0.0%
0.00797		5	1	1	1	1	1	0	0	0.0%	0.0%
0.01594		5	1	1	1	1	1	0	0	0.0%	0.0%

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	1.18	0.9264	1.434	0.968	1.492	0.09135	0.2043	17.31%	0.0%
0.00399		5	1.384	1.315	1.453	1.328	1.462	0.025	0.05589	4.04%	-17.29%
0.00797		5	1.416	1.246	1.586	1.256	1.598	0.06106	0.1365	9.64%	-20.0%
0.01594		5	1.46	1.288	1.633	1.326	1.666	0.06206	0.1388	9.5%	-23.76%

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	1
0.00399		1	1	1	1	1
0.00797		1	1	1	1	1
0.01594		1	1	1	1	1

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.968	1.032	1.232	1.492	1.176
0.00399		1.358	1.328	1.422	1.35	1.462
0.00797		1.598	1.508	1.256	1.338	1.38
0.01594		1.472	1.5	1.326	1.666	1.338

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	5/5	5/5	5/5	5/5	5/5
0.00399		5/5	5/5	5/5	5/5	5/5
0.00797		5/5	5/5	5/5	5/5	5/5
0.01594		5/5	5/5	5/5	5/5	5/5

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 11-2592-9743 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 23 Mar-16 10:08 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	0.01594	>0.01594	NA	6274

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		0.00399	27.5	17	1	8	0.7500	Asymp	Non-Significant Effect
		0.00797	27.5	17	1	8	0.7500	Asymp	Non-Significant Effect
		0.01594	27.5	17	1	8	0.7500	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3	65540	<0.0001	Significant Effect
Error	0	0	16			
Total	0		19			

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	1	1	1	1	1	1	0	0.0%	0.0%
0.00399		5	1	1	1	1	1	1	0	0.0%	0.0%
0.00797		5	1	1	1	1	1	1	0	0.0%	0.0%
0.01594		5	1	1	1	1	1	1	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
0.00399		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
0.00797		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
0.01594		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	1
0.00399		1	1	1	1	1
0.00797		1	1	1	1	1
0.01594		1	1	1	1	1

Angular (Corrected) Transformed Detail

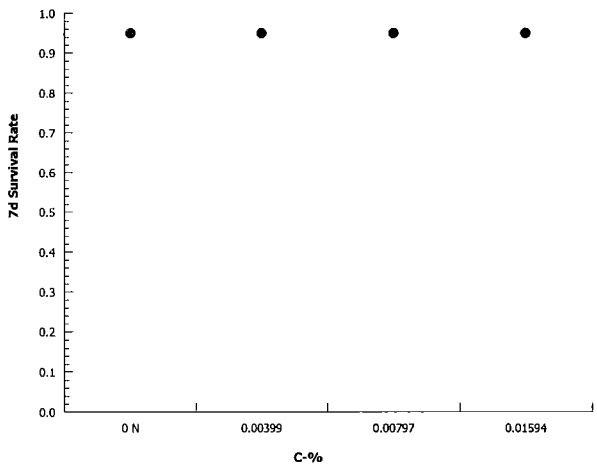
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.345	1.345	1.345	1.345	1.345
0.00399		1.345	1.345	1.345	1.345	1.345
0.00797		1.345	1.345	1.345	1.345	1.345
0.01594		1.345	1.345	1.345	1.345	1.345

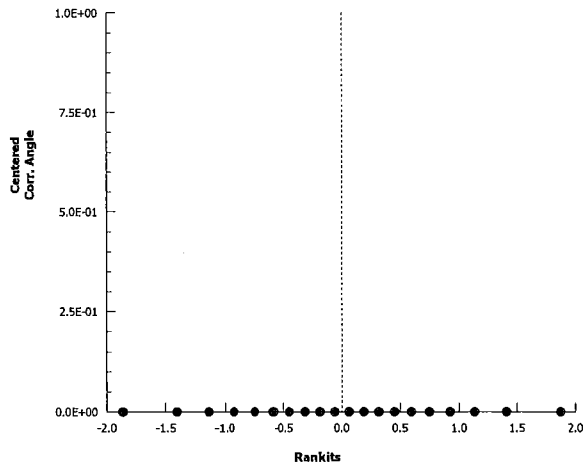
7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	5/5	5/5	5/5	5/5	5/5
0.00399		5/5	5/5	5/5	5/5	5/5
0.00797		5/5	5/5	5/5	5/5	5/5
0.01594		5/5	5/5	5/5	5/5	5/5

Pacific Topsmelt 7-d Survival and Growth Test					**Aquatic Bioassay & Consulting Labs, Inc.**
Analysis ID:	11-2592-9743	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Mar-16 10:08	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 04-1618-6991 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.8.7
Analyzed: 23 Mar-16 10:08 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	17.2%	0.01594	>0.01594	NA	6274

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		0.00399	-2.243	2.227	0.203	8	0.9985	CDF	Non-Significant Effect
		0.00797	-2.594	2.227	0.203	8	0.9994	CDF	Non-Significant Effect
		0.01594	-3.082	2.227	0.203	8	0.9998	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2309606	0.07698688	3	3.721	0.0333	Significant Effect
Error	0.3309951	0.0206872	16			
Total	0.5619557		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.943	11.34	0.1760	Equal Variances
Variances	Mod Levene Equality of Variance	1.904	5.953	0.1828	Equal Variances
Variances	Levene Equality of Variance	1.327	5.292	0.3004	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9664	0.866	0.6781	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.0968	0.2235	1.0000	Normal Distribution
Distribution	D'Agostino Skewness	1.264	2.576	0.2061	Normal Distribution
Distribution	D'Agostino Kurtosis	0.5635	2.576	0.5731	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	1.916	9.21	0.3836	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.2832	3.878	0.6634	Normal Distribution

Mean Dry Biomass-mg Summary

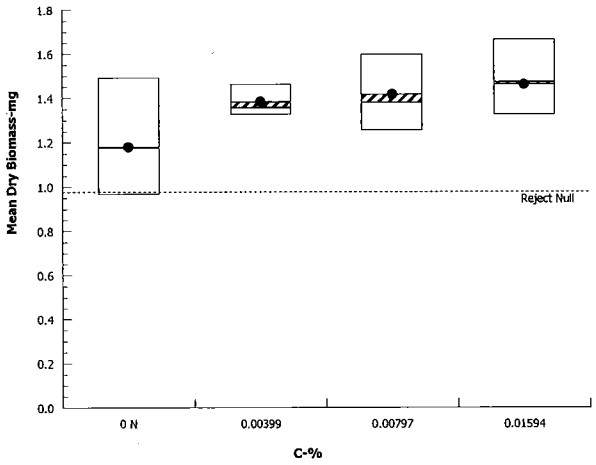
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	1.18	0.9264	1.434	1.176	0.968	1.492	0.09135	17.31%	0.0%
0.00399		5	1.384	1.315	1.453	1.358	1.328	1.462	0.025	4.04%	-17.29%
0.00797		5	1.416	1.246	1.586	1.38	1.256	1.598	0.06106	9.64%	-20.0%
0.01594		5	1.46	1.288	1.633	1.472	1.326	1.666	0.06206	9.5%	-23.76%

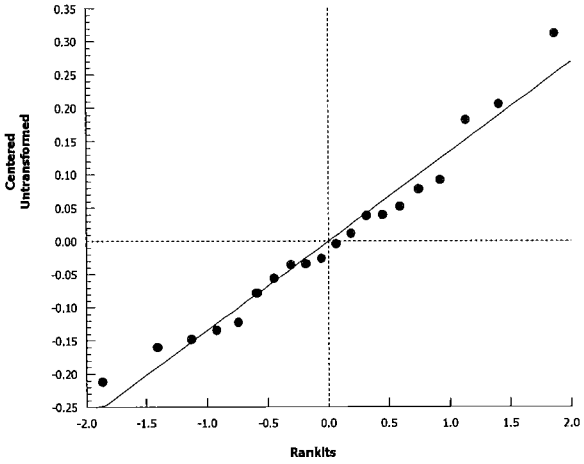
Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.968	1.032	1.232	1.492	1.176
0.00399		1.358	1.328	1.422	1.35	1.462
0.00797		1.598	1.508	1.256	1.338	1.38
0.01594		1.472	1.5	1.326	1.666	1.338

Pacific Topsmelt 7-d Survival and Growth Test				Aquatic Bioassay & Consulting Labs, Inc.	
Analysis ID:	04-1618-6991	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Mar-16 10:08	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Report Date: 23 Mar-16 10:09 (p 1 of 2)
Test Code: DCO0316.012tops | 13-2186-6425

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	04-9832-0951	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Mar-16 10:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>0.01594	N/A	N/A	<6274	NA	NA
EC10	>0.01594	N/A	N/A	<6274	NA	NA
EC15	>0.01594	N/A	N/A	<6274	NA	NA
EC20	>0.01594	N/A	N/A	<6274	NA	NA
EC25	>0.01594	N/A	N/A	<6274	NA	NA
EC40	>0.01594	N/A	N/A	<6274	NA	NA
EC50	>0.01594	N/A	N/A	<6274	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	1	1	1	0	0	0.0%	0.0%	25	25
0.00399		5	1	1	1	0	0	0.0%	0.0%	25	25
0.00797		5	1	1	1	0	0	0.0%	0.0%	25	25
0.01594		5	1	1	1	0	0	0.0%	0.0%	25	25

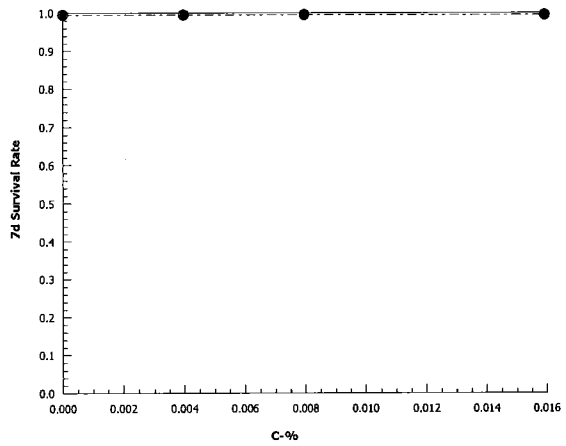
7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	1
0.00399		1	1	1	1	1
0.00797		1	1	1	1	1
0.01594		1	1	1	1	1

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	5/5	5/5	5/5	5/5	5/5
0.00399		5/5	5/5	5/5	5/5	5/5
0.00797		5/5	5/5	5/5	5/5	5/5
0.01594		5/5	5/5	5/5	5/5	5/5

Graphics



Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	18-3029-4733	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Mar-16 10:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	692059	280	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>0.01594	N/A	N/A	<6274	NA	NA
IC10	>0.01594	N/A	N/A	<6274	NA	NA
IC15	>0.01594	N/A	N/A	<6274	NA	NA
IC20	>0.01594	N/A	N/A	<6274	NA	NA
IC25	>0.01594	N/A	N/A	<6274	NA	NA
IC40	>0.01594	N/A	N/A	<6274	NA	NA
IC50	>0.01594	N/A	N/A	<6274	NA	NA

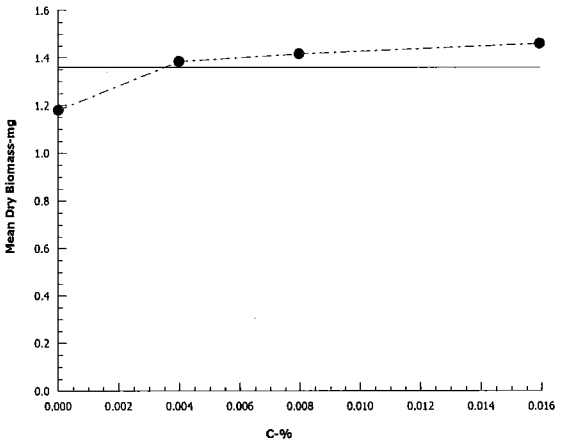
Mean Dry Biomass-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	1.18	0.968	1.492	0.09135	0.2043	17.31%	0.0%
0.00399		5	1.384	1.328	1.462	0.025	0.05589	4.04%	-17.29%
0.00797		5	1.416	1.256	1.598	0.06106	0.1365	9.64%	-20.0%
0.01594		5	1.46	1.326	1.666	0.06206	0.1388	9.5%	-23.76%

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.968	1.032	1.232	1.492	1.176
0.00399		1.358	1.328	1.422	1.35	1.462
0.00797		1.598	1.508	1.256	1.338	1.38
0.01594		1.472	1.5	1.326	1.666	1.338

Graphics



CETIS Measurement Report

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	03-7290-9120	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	04 Mar-16 10:52	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	11 Mar-16 10:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	19-6943-7349	**Code:**	DCO0316.012tops	**Client:**	DCOR, LLC.
Sample Date:	03 Mar-16 07:00	**Material:**	Sample Water	**Project:**	
Receive Date:	03 Mar-16 12:30	**Source:**	Bioassay Report		
Sample Age:	28h (6.8 °C)	**Station:**	Platform Edith		

Dissolved Oxygen-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	8	7	6.613	7.387	6.4	7.7	0.1637	0.4629	6.61%	0
0.00399		8	6.863	6.673	7.052	6.6	7.2	0.08004	0.2264	3.3%	0
0.00797		8	6.85	6.732	6.968	6.7	7.1	0.05	0.1414	2.07%	0
0.01594		8	6.875	6.751	6.999	6.7	7.1	0.05261	0.1488	2.16%	0
Overall		32	6.897			6.4	7.7				0 (0%)

pH-Units

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	8	7.65	7.587	7.713	7.5	7.7	0.02673	0.07559	0.99%	0
0.00399		8	7.85	7.741	7.959	7.7	8.1	0.04629	0.1309	1.67%	0
0.00797		8	7.838	7.729	7.946	7.7	8.1	0.04605	0.1302	1.66%	0
0.01594		8	7.8	7.652	7.948	7.5	8.1	0.06268	0.1773	2.27%	0
Overall		32	7.784			7.5	8.1				0 (0%)

Salinity-ppt

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	8	34	34	34	34	34	0	0	0.0%	0
0.00399		8	34	34	34	34	34	0	0	0.0%	0
0.00797		8	34	34	34	34	34	0	0	0.0%	0
0.01594		8	34	34	34	34	34	0	0	0.0%	0
Overall		32	34			34	34				0 (0%)

Temperature-°C

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	8	21	21	21	21	21	0	0	0.0%	0
0.00399		8	21	21	21	21	21	0	0	0.0%	0
0.00797		8	21	21	21	21	21	0	0	0.0%	0
0.01594		8	21	21	21	21	21	0	0	0.0%	0
Overall		32	21			21	21				0 (0%)

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

C-%	Control Type	1	2	3	4	5	6	7	8
0	Negative Contr	6.4	6.5	6.7	6.9	7.1	7.5	7.7	7.2
0.00399		6.7	6.8	6.7	7.2	7.2	6.6	6.8	6.9
0.00797		6.8	6.8	6.8	7	7.1	6.7	6.7	6.9
0.01594		6.8	6.8	6.8	7.1	7.1	6.7	6.8	6.9

pH-Units

C-%	Control Type	1	2	3	4	5	6	7	8
0	Negative Contr	7.7	7.7	7.7	7.7	7.5	7.6	7.7	7.6
0.00399		7.7	7.8	7.8	8.1	7.9	7.9	7.9	7.7
0.00797		7.7	7.8	7.8	8.1	7.9	7.8	7.9	7.7
0.01594		7.7	7.5	7.8	8.1	7.9	7.8	7.9	7.7

Salinity-ppt

C-%	Control Type	1	2	3	4	5	6	7	8
0	Negative Contr	34	34	34	34	34	34	34	34
0.00399		34	34	34	34	34	34	34	34
0.00797		34	34	34	34	34	34	34	34
0.01594		34	34	34	34	34	34	34	34

Temperature-°C

C-%	Control Type	1	2	3	4	5	6	7	8
0	Negative Contr	21	21	21	21	21	21	21	21
0.00399		21	21	21	21	21	21	21	21
0.00797		21	21	21	21	21	21	21	21
0.01594		21	21	21	21	21	21	21	21

aquatic bioassay & consulting laboratories, inc

March 28, 2016

Mr. Jay Rao
DCOR
290 Maple Ct., Suite 290
Ventura, CA 93003

Dear Mr. Rao:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA/600/R-95/136.* Results were as follows:

CLIENT:	DCOR
SAMPLE I.D.:	Platform Edith
DATE RECEIVED:	3 March - 2016
ABC LAB. NO.:	DCO0316.012

CHRONIC ABALONE LARVAL DEVELOPMENT BIOASSAY

IWC = 12,544.8:1

TST RESULT

PASS

Yours very truly,

Scott Johnson
Laboratory Director

TST Summary Sheet

Lab Name	Aquatic Bioassay Labs.	**Client Name**	DCOR
Test ID	Platform Edith	**Test Species**	*H. rufescens (red abalone)*
Test Date	3/4/2016	**Test Type**	Chronic
Test Duration	48 hours	**Endpoint**	Larval Development
Critical Conc.	0.00797%		

Statistic	Control	Critical Concentration
Percent Mean of Raw Data	1.00	1.00
Mean used in Calcuation (transformed)	1.52	1.52
Variance used in Calcuation (transformed)	0.000	0.000
Standard Deviation of Transformed Data	0.000	0.000
CV of Transformed Data	0.000	0.000
n	5	5

Mean % Effect at Critical Conc.
0.00

Calculated t-value	Degrees of Freedom	Table t-value	Percent Difference
			0.00000

Results	
Pass	Sample is Non-toxic

Raw Data

Control Data		Critical Concentration Data	
No. of Organisms Exposed or Counted	Response (Final Count, Weight, Length, etc.)	No. of Organisms Exposed or Counted	Response (Final Count, Weight, Length, etc.)
100	100	100	100
100	100	100	100
100	100	100	100
100	100	100	100
100	100	100	100

CETIS Summary Report

Report Date: 23 Mar-16 09:59 (p 1 of 1)
Test Code: DCO0316.012abs | 13-0880-4196

Red Abalone Larval Development Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	07-3859-6746	**Test Type:**	Development	**Analyst:**	
Start Date:	04 Mar-16 12:31	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	06 Mar-16 12:31	**Species:**	Haliotis rufescens	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Cultured Abalone	**Age:**	

Sample ID:	01-2591-1415	**Code:**	DCO0316.012abs	**Client:**	DCOR, LLC.
Sample Date:	03 Mar-16 07:00	**Material:**	Sample Water	**Project:**	
Receive Date:	03 Mar-16 12:30	**Source:**	Bioassay Report		
Sample Age:	30h (6.8 °C)	**Station:**	Platform Edith		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
04-0536-5349	Proportion Normal	0.01594	>0.01594	NA	NA	6274	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
05-2855-9851	Proportion Normal	EC5	>0.01594	N/A	N/A	<6274	Linear Interpolation (ICPIN)
		EC10	>0.01594	N/A	N/A	<6274	
		EC15	>0.01594	N/A	N/A	<6274	
		EC20	>0.01594	N/A	N/A	<6274	
		EC25	>0.01594	N/A	N/A	<6274	
		EC40	>0.01594	N/A	N/A	<6274	
		EC50	>0.01594	N/A	N/A	<6274	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
04-0536-5349	Proportion Normal	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
05-2855-9851	Proportion Normal	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

Proportion Normal Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	1	1	1	1	1	0	0	0.0%	0.0%
0.00399		5	1	1	1	1	1	0	0	0.0%	0.0%
0.00797		5	1	1	1	1	1	0	0	0.0%	0.0%
0.01594		5	1	1	1	1	1	0	0	0.0%	0.0%

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	1
0.00399		1	1	1	1	1
0.00797		1	1	1	1	1
0.01594		1	1	1	1	1

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	100/100	100/100	100/100	100/100	100/100
0.00399		100/100	100/100	100/100	100/100	100/100
0.00797		100/100	100/100	100/100	100/100	100/100
0.01594		100/100	100/100	100/100	100/100	100/100

CETIS Analytical Report

Report Date: 23 Mar-16 09:58 (p 1 of 2)
Test Code: DCO0316.012abs | 13-0880-4196

Red Abalone Larval Development Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	04-0536-5349	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Mar-16 9:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	0.01594	>0.01594	NA	6274

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		0.00399	27.5	17	1	8	0.7500	Asymp	Non-Significant Effect
		0.00797	27.5	17	1	8	0.7500	Asymp	Non-Significant Effect
		0.01594	27.5	17	1	8	0.7500	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	3	65540	<0.0001	Significant Effect
Error	0	0	16			
Total	0		19			

Proportion Normal Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	1	1	1	1	1	1	0	0.0%	0.0%
0.00399		5	1	1	1	1	1	1	0	0.0%	0.0%
0.00797		5	1	1	1	1	1	1	0	0.0%	0.0%
0.01594		5	1	1	1	1	1	1	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.521	1.521	1.521	1.521	1.521	1.521	0	0.0%	0.0%
0.00399		5	1.521	1.521	1.521	1.521	1.521	1.521	0	0.0%	0.0%
0.00797		5	1.521	1.521	1.521	1.521	1.521	1.521	0	0.0%	0.0%
0.01594		5	1.521	1.521	1.521	1.521	1.521	1.521	0	0.0%	0.0%

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	1
0.00399		1	1	1	1	1
0.00797		1	1	1	1	1
0.01594		1	1	1	1	1

Angular (Corrected) Transformed Detail

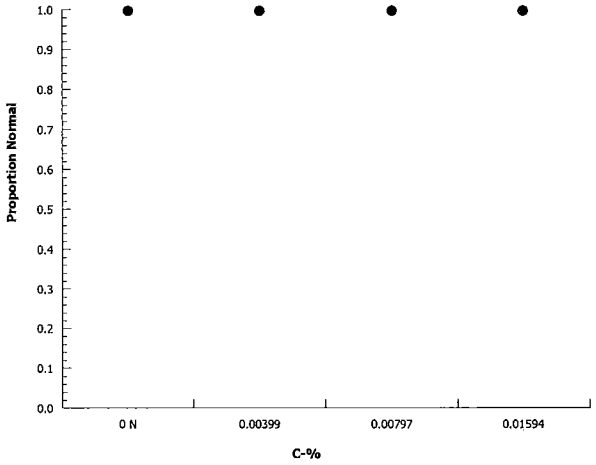
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.521	1.521	1.521	1.521	1.521
0.00399		1.521	1.521	1.521	1.521	1.521
0.00797		1.521	1.521	1.521	1.521	1.521
0.01594		1.521	1.521	1.521	1.521	1.521

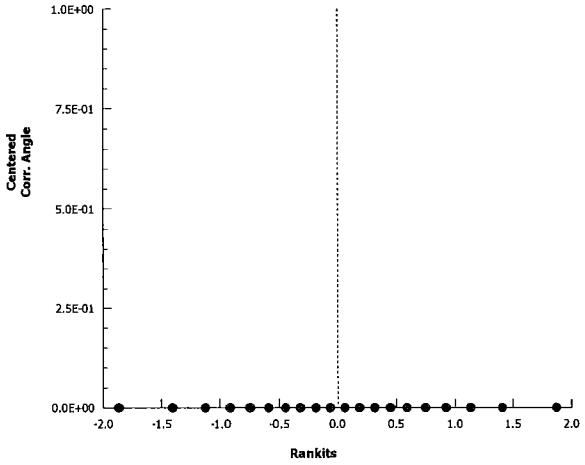
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	100/100	100/100	100/100	100/100	100/100
0.00399		100/100	100/100	100/100	100/100	100/100
0.00797		100/100	100/100	100/100	100/100	100/100
0.01594		100/100	100/100	100/100	100/100	100/100

Red Abalone Larval Development Test					Aquatic Bioassay & Consulting Labs, Inc.
Analysis ID:	04-0536-5349	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Mar-16 9:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Report Date: 23 Mar-16 09:59 (p 1 of 1)
Test Code: DCO0316.012abs | 13-0880-4196

Red Abalone Larval Development Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-2855-9851	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Mar-16 9:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>0.01594	N/A	N/A	<6274	NA	NA
EC10	>0.01594	N/A	N/A	<6274	NA	NA
EC15	>0.01594	N/A	N/A	<6274	NA	NA
EC20	>0.01594	N/A	N/A	<6274	NA	NA
EC25	>0.01594	N/A	N/A	<6274	NA	NA
EC40	>0.01594	N/A	N/A	<6274	NA	NA
EC50	>0.01594	N/A	N/A	<6274	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	1	1	1	0	0	0.0%	0.0%	500	500
0.00399		5	1	1	1	0	0	0.0%	0.0%	500	500
0.00797		5	1	1	1	0	0	0.0%	0.0%	500	500
0.01594		5	1	1	1	0	0	0.0%	0.0%	500	500

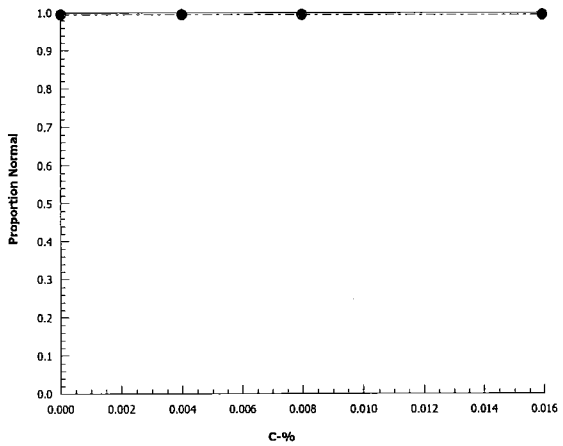
Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	1
0.00399		1	1	1	1	1
0.00797		1	1	1	1	1
0.01594		1	1	1	1	1

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	100/100	100/100	100/100	100/100	100/100
0.00399		100/100	100/100	100/100	100/100	100/100
0.00797		100/100	100/100	100/100	100/100	100/100
0.01594		100/100	100/100	100/100	100/100	100/100

Graphics



CETIS Measurement Report

Red Abalone Larval Development Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	07-3859-6746	**Test Type:**	Development	**Analyst:**	
Start Date:	04 Mar-16 12:31	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	06 Mar-16 12:31	**Species:**	Haliotis rufescens	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Cultured Abalone	**Age:**	

Sample ID:	01-2591-1415	**Code:**	DCO0316.012abs	**Client:**	DCOR, LLC.
Sample Date:	03 Mar-16 07:00	**Material:**	Sample Water	**Project:**	
Receive Date:	03 Mar-16 12:30	**Source:**	Bioassay Report		
Sample Age:	30h (6.8 °C)	**Station:**	Platform Edith		

Parameter Acceptability Criteria

Parameter	Min	Max	Acceptability Limits	Overlap	Decision
Salinity-ppt	34	34	32 - 36	Yes	Results Within Limits
Temperature-°C	14.1	14.3	14 - 16	Yes	Results Within Limits

Dissolved Oxygen-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	6.6	4.059	9.141	6.4	6.8	0.2	0.2828	4.29%	0
0.00399		2	6.7	5.429	7.971	6.6	6.8	0.09999	0.1414	2.11%	0
0.00797		2	6.75	6.115	7.385	6.7	6.8	0.04999	0.07069	1.05%	0
0.01594		2	6.8	4.259	9.341	6.6	7	0.2	0.2828	4.16%	0
Overall		8	6.713			6.4	7				0 (0%)

pH-Units

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.75	7.115	8.385	7.7	7.8	0.05001	0.07072	0.91%	0
0.00399		2	7.85	7.215	8.485	7.8	7.9	0.05	0.07071	0.9%	0
0.00797		2	7.85	7.215	8.485	7.8	7.9	0.05	0.07071	0.9%	0
0.01594		2	7.85	7.215	8.485	7.8	7.9	0.05	0.07071	0.9%	0
Overall		8	7.825			7.7	7.9				0 (0%)

Salinity-ppt

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
0.00399		2	34	34	34	34	34	0	0	0.0%	0
0.00797		2	34	34	34	34	34	0	0	0.0%	0
0.01594		2	34	34	34	34	34	0	0	0.0%	0
Overall		8	34			34	34				0 (0%)

Temperature-°C

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.2	12.93	15.47	14.1	14.3	0.1	0.1414	1.0%	0
0.00399		2	14.2	12.93	15.47	14.1	14.3	0.1	0.1414	1.0%	0
0.00797		2	14.2	12.93	15.47	14.1	14.3	0.1	0.1414	1.0%	0
0.01594		2	14.2	12.93	15.47	14.1	14.3	0.1	0.1414	1.0%	0
Overall		8	14.2			14.1	14.3				0 (0%)

Red Abalone Larval Development Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

C-%	Control Type	1	2
0	Negative Contr	6.8	6.4
0.00399		6.8	6.6
0.00797		6.8	6.7
0.01594		7	6.6

pH-Units

C-%	Control Type	1	2
0	Negative Contr	7.8	7.7
0.00399		7.8	7.9
0.00797		7.8	7.9
0.01594		7.8	7.9

Salinity-ppt

C-%	Control Type	1	2
0	Negative Contr	34	34
0.00399		34	34
0.00797		34	34
0.01594		34	34

Temperature-°C

C-%	Control Type	1	2
0	Negative Contr	14.1	14.3
0.00399		14.1	14.3
0.00797		14.1	14.3
0.01594		14.1	14.3

aquatic bioassay & consulting laboratories, inc

March 28, 2016

Mr. Jay Rao
DCOR
290 Maple Ct., Suite 290
Ventura, CA 93003

Dear Mr. Rao:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA/R-95/136*. Results were as follows:

CLIENT:	DCOR
SAMPLE I.D.:	Platform Edith
DATE RECEIVED:	3 March - 2016
ABC LAB. NO.:	DCO0316.012

CHRONIC KELP GERMINATION AND GROWTH BIOASSAY

IWC = 12,544.8:1

TST RESULT

Germination	PASS
Tube Length	PASS

Yours very truly,

Scott Johnson
Laboratory Director

TST Summary Sheet

Lab Name	Aquatic Bioassay Labs.	**Client Name**	DCOR
Test ID	Platform Edith	**Test Species**	*M. pyrifera (giant kelp)*
Test Date	3/4/2016	**Test Type**	Chronic
Test Duration	48 hours	**Endpoint**	Germination
Critical Conc.	0.00797%		

Statistic	Control	Critical Concentration
Percent Mean of Raw Data	0.92	0.92
Mean used in Calcuation (transformed)	1.29	1.29
Variance used in Calcuation (transformed)	0.001	0.001
Standard Deviation of Transformed Data	0.037	0.037
CV of Transformed Data	0.029	0.029
n	5	5

Mean % Effect at Critical Conc.
0.00

Calculated t-value	Degrees of Freedom	Table t-value	Percent Difference
15.5398	7	1.8946	

Results	
Pass	Sample is Non-toxic

Raw Data

Control Data		Critical Concentration Data	
No. of Organisms Exposed or Counted	Response (Final Count, Weight, Length, etc.)	No. of Organisms Exposed or Counted	Response (Final Count, Weight, Length, etc.)
100	92	100	93
100	90	100	92
100	91	100	91
100	93	100	90
100	95	100	95

TST Summary Sheet

Lab Name	Aquatic Bioassay Labs.	**Client Name**	DCOR
Test ID	Platform Edith	**Test Species**	*M. pyrifera (giant kelp)*
Test Date	3/4/2016	**Test Type**	Chronic
Test Duration	48 hours	**Endpoint**	Germ-Tube Length
Critical Conc.	0.00797%		

Statistic	Control	Critical Concentration
Mean of Raw Data	14.54	14.78
Mean used in Calculation (non-transformed)	14.54	14.78
Variance used in Calculation (non-transformed)	0.133	0.112
Standard Deviation of Raw Data	0.365	0.335
CV of Raw Data	0.025	0.023
n	5	5

Mean % Effect at Critical Conc.

-1.65

Calculated t-value	Degrees of Freedom	Table t-value	Percent Difference
20.0472	7	1.8946	

Results

Pass Sample is Non-toxic

Raw Data

Control Data		Critical Concentration Data	
No. of Organisms Exposed or Counted	Response (Final Count, Weight, Length, etc.)	No. of Organisms Exposed or Counted	Response (Final Count, Weight, Length, etc.)
100	14.3	100	15
100	14.1	100	14.8
100	14.8	100	15
100	15	100	14.2
100	14.5	100	14.9

CETIS Summary Report

Test Code: DCO0316.012klp | 07-7613-5363

Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	19-3370-8155	**Test Type:**	Growth-Germination	**Analyst:**	
Start Date:	04 Mar-16 15:01	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	06 Mar-16 15:01	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Aquatic Bioassay Labs Collection	**Age:**	

Sample ID:	05-2320-3763	**Code:**	DCO0316.012klp	**Client:**	DCOR, LLC.
Sample Date:	03 Mar-16 07:00	**Material:**	Sample Water	**Project:**	
Receive Date:	03 Mar-16 12:30	**Source:**	Bioassay Report		
Sample Age:	32h (6.8 °C)	**Station:**	Platform Edith		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
19-6240-6250	Germination Rate	0.01594	>0.01594	NA	3.31%	6274	Dunnett Multiple Comparison Test
11-8017-2104	Mean Length	0.01594	>0.01594	NA	2.59%	6274	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
09-9085-2855	Germination Rate	EC5	>0.01594	N/A	N/A	<6274	Linear Interpolation (ICPIN)
		EC10	>0.01594	N/A	N/A	<6274	
		EC15	>0.01594	N/A	N/A	<6274	
		EC20	>0.01594	N/A	N/A	<6274	
		EC25	>0.01594	N/A	N/A	<6274	
		EC40	>0.01594	N/A	N/A	<6274	
		EC50	>0.01594	N/A	N/A	<6274	
20-5654-8087	Mean Length	IC5	>0.01594	N/A	N/A	<6274	Linear Interpolation (ICPIN)
		IC10	>0.01594	N/A	N/A	<6274	
		IC15	>0.01594	N/A	N/A	<6274	
		IC20	>0.01594	N/A	N/A	<6274	
		IC25	>0.01594	N/A	N/A	<6274	
		IC40	>0.01594	N/A	N/A	<6274	
		IC50	>0.01594	N/A	N/A	<6274	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
09-9085-2855	Germination Rate	Control Resp	0.922	0.7 - NL	Yes	Passes Acceptability Criteria
19-6240-6250	Germination Rate	Control Resp	0.922	0.7 - NL	Yes	Passes Acceptability Criteria
11-8017-2104	Mean Length	Control Resp	14.54	10 - NL	Yes	Passes Acceptability Criteria
20-5654-8087	Mean Length	Control Resp	14.54	10 - NL	Yes	Passes Acceptability Criteria
19-6240-6250	Germination Rate	PMSD	0.03305	NL - 0.2	No	Passes Acceptability Criteria
11-8017-2104	Mean Length	PMSD	0.02586	NL - 0.2	No	Passes Acceptability Criteria

Germination Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	0.922	0.8981	0.9459	0.9	0.95	0.008602	0.01924	2.09%	0.0%
0.00399		5	0.93	0.8983	0.9617	0.9	0.96	0.0114	0.0255	2.74%	-0.87%
0.00797		5	0.922	0.8981	0.9459	0.9	0.95	0.008602	0.01924	2.09%	0.0%
0.01594		5	0.916	0.8993	0.9327	0.9	0.93	0.006	0.01342	1.47%	0.65%

Mean Length Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	14.54	14.09	14.99	14.1	15	0.1631	0.3647	2.51%	0.0%
0.00399		5	14.54	14.43	14.65	14.4	14.6	0.04	0.08944	0.62%	0.0%
0.00797		5	14.78	14.36	15.2	14.2	15	0.1497	0.3347	2.26%	-1.65%
0.01594		5	14.42	14.2	14.64	14.2	14.6	0.08	0.1789	1.24%	0.83%

Analyst: ____ QA: PASS

Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Germination Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.92	0.9	0.91	0.93	0.95
0.00399		0.9	0.93	0.96	0.91	0.95
0.00797		0.93	0.92	0.91	0.9	0.95
0.01594		0.93	0.91	0.9	0.93	0.91

Mean Length Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	14.3	14.1	14.8	15	14.5
0.00399		14.6	14.4	14.6	14.6	14.5
0.00797		15	14.8	15	14.2	14.9
0.01594		14.2	14.6	14.3	14.6	14.4

Germination Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	92/100	90/100	91/100	93/100	95/100
0.00399		90/100	93/100	96/100	91/100	95/100
0.00797		93/100	92/100	91/100	90/100	95/100
0.01594		93/100	91/100	90/100	93/100	91/100

Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 19-6240-6250 **Endpoint:** Germination Rate **CETIS Version:** CETISv1.8.7
Analyzed: 25 Mar-16 15:42 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	3.31%	0.01594	>0.01594	NA	6274

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		0.00399	-0.7002	2.227	0.054	8	0.9270	CDF	Non-Significant Effect
		0.00797	0	2.227	0.054	8	0.7500	CDF	Non-Significant Effect
		0.01594	0.4935	2.227	0.054	8	0.5476	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002151273	0.000717091	3	0.4821	0.6994	Non-Significant Effect
Error	0.0238007	0.001487544	16			
Total	0.02595197		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.862	11.34	0.6015	Equal Variances
Variances	Mod Levene Equality of Variance	1.544	5.953	0.2539	Equal Variances
Variances	Levene Equality of Variance	0.9766	5.292	0.4283	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9523	0.866	0.4036	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.1399	0.2235	0.3879	Normal Distribution
Distribution	D'Agostino Skewness	0.6803	2.576	0.4963	Normal Distribution
Distribution	D'Agostino Kurtosis	0.9649	2.576	0.3346	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	1.394	9.21	0.4981	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.3833	3.878	0.4011	Normal Distribution

Germination Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	0.922	0.8981	0.9459	0.92	0.9	0.95	0.008602	2.09%	0.0%
0.00399		5	0.93	0.8983	0.9617	0.93	0.9	0.96	0.0114	2.74%	-0.87%
0.00797		5	0.922	0.8981	0.9459	0.92	0.9	0.95	0.008602	2.09%	0.0%
0.01594		5	0.916	0.8993	0.9327	0.91	0.9	0.93	0.006	1.47%	0.65%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.29	1.243	1.336	1.284	1.249	1.345	0.0166	2.88%	0.0%
0.00399		5	1.307	1.243	1.37	1.303	1.249	1.369	0.02281	3.9%	-1.33%
0.00797		5	1.29	1.243	1.336	1.284	1.249	1.345	0.0166	2.88%	0.0%
0.01594		5	1.277	1.247	1.308	1.266	1.249	1.303	0.01089	1.91%	0.93%

Germination Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.92	0.9	0.91	0.93	0.95
0.00399		0.9	0.93	0.96	0.91	0.95
0.00797		0.93	0.92	0.91	0.9	0.95
0.01594		0.93	0.91	0.9	0.93	0.91

Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.284	1.249	1.266	1.303	1.345
0.00399		1.249	1.303	1.369	1.266	1.345
0.00797		1.303	1.284	1.266	1.249	1.345
0.01594		1.303	1.266	1.249	1.303	1.266

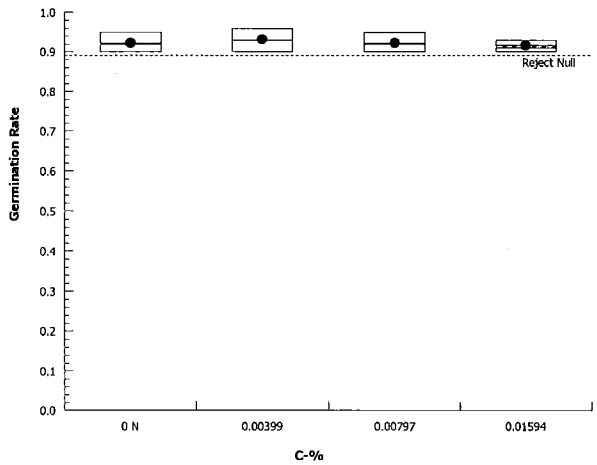
Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

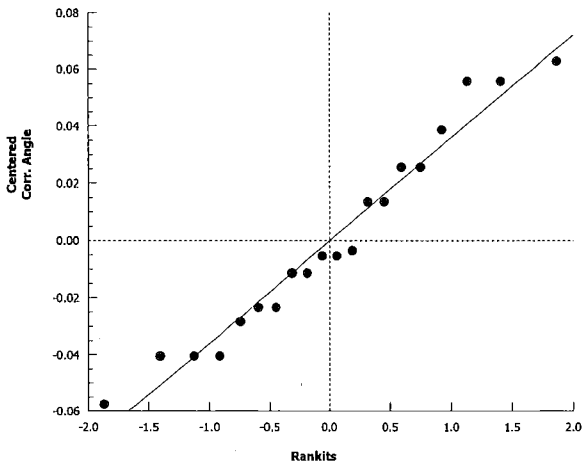
Analysis ID:	19-6240-6250	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Mar-16 15:42	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Germination Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	92/100	90/100	91/100	93/100	95/100
0.00399		90/100	93/100	96/100	91/100	95/100
0.00797		93/100	92/100	91/100	90/100	95/100
0.01594		93/100	91/100	90/100	93/100	91/100

Graphics





Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	11-8017-2104	**Endpoint:**	Mean Length	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Mar-16 15:42	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	2.59%	0.01594	>0.01594	NA	6274

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		0.00399	0	2.227	0.376	8	0.7500	CDF	Non-Significant Effect
		0.00797	-1.422	2.227	0.376	8	0.9863	CDF	Non-Significant Effect
		0.01594	0.7108	2.227	0.376	8	0.4518	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.3419996	0.1139999	3	1.6	0.2286	Non-Significant Effect
Error	1.14	0.07125002	16			
Total	1.482		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.922	11.34	0.0744	Equal Variances
Variances	Mod Levene Equality of Variance	1.831	5.953	0.1952	Equal Variances
Variances	Levene Equality of Variance	2.226	5.292	0.1246	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9637	0.866	0.6194	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.1351	0.2235	0.4469	Normal Distribution
Distribution	D'Agostino Skewness	1.273	2.576	0.2031	Normal Distribution
Distribution	D'Agostino Kurtosis	0.9208	2.576	0.3571	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	2.468	9.21	0.2912	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.3763	3.878	0.4160	Normal Distribution

Mean Length Summary

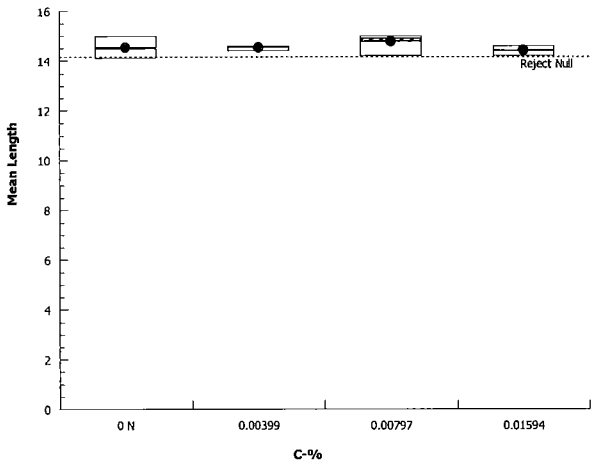
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	14.54	14.09	14.99	14.5	14.1	15	0.1631	2.51%	0.0%
0.00399		5	14.54	14.43	14.65	14.6	14.4	14.6	0.03998	0.61%	0.0%
0.00797		5	14.78	14.36	15.2	14.9	14.2	15	0.1497	2.26%	-1.65%
0.01594		5	14.42	14.2	14.64	14.4	14.2	14.6	0.08	1.24%	0.83%

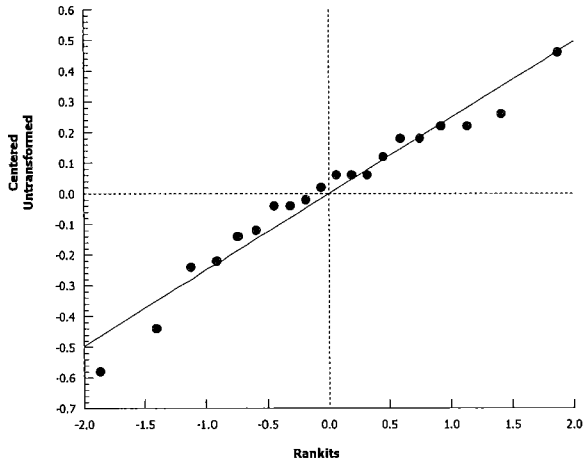
Mean Length Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	14.3	14.1	14.8	15	14.5
0.00399		14.6	14.4	14.6	14.6	14.5
0.00797		15	14.8	15	14.2	14.9
0.01594		14.2	14.6	14.3	14.6	14.4

Macrocystis Germination and Germ Tube Growth Test				**Aquatic Bioassay & Consulting Labs, Inc.**	
Analysis ID:	11-8017-2104	**Endpoint:**	Mean Length	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Mar-16 15:42	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Test Code: DCO0316.012klp | 07-7613-5363

Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	09-9085-2855	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Mar-16 15:42	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>0.01594	N/A	N/A	<6274	NA	NA
EC10	>0.01594	N/A	N/A	<6274	NA	NA
EC15	>0.01594	N/A	N/A	<6274	NA	NA
EC20	>0.01594	N/A	N/A	<6274	NA	NA
EC25	>0.01594	N/A	N/A	<6274	NA	NA
EC40	>0.01594	N/A	N/A	<6274	NA	NA
EC50	>0.01594	N/A	N/A	<6274	NA	NA

Germination Rate Summary

										Calculated Variate(A/B)	
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	0.922	0.9	0.95	0.008602	0.01923	2.09%	0.0%	461	500
0.00399		5	0.93	0.9	0.96	0.0114	0.02549	2.74%	-0.87%	465	500
0.00797		5	0.922	0.9	0.95	0.008602	0.01923	2.09%	0.0%	461	500
0.01594		5	0.916	0.9	0.93	0.006	0.01342	1.47%	0.65%	458	500

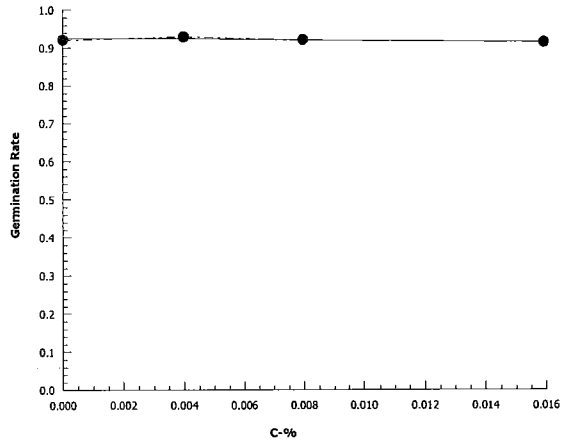
Germination Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.92	0.9	0.91	0.93	0.95
0.00399		0.9	0.93	0.96	0.91	0.95
0.00797		0.93	0.92	0.91	0.9	0.95
0.01594		0.93	0.91	0.9	0.93	0.91

Germination Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	92/100	90/100	91/100	93/100	95/100
0.00399		90/100	93/100	96/100	91/100	95/100
0.00797		93/100	92/100	91/100	90/100	95/100
0.01594		93/100	91/100	90/100	93/100	91/100

Graphics



Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	20-5654-8087	**Endpoint:**	Mean Length	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Mar-16 15:42	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	894306	280	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>0.01594	N/A	N/A	<6274	NA	NA
IC10	>0.01594	N/A	N/A	<6274	NA	NA
IC15	>0.01594	N/A	N/A	<6274	NA	NA
IC20	>0.01594	N/A	N/A	<6274	NA	NA
IC25	>0.01594	N/A	N/A	<6274	NA	NA
IC40	>0.01594	N/A	N/A	<6274	NA	NA
IC50	>0.01594	N/A	N/A	<6274	NA	NA

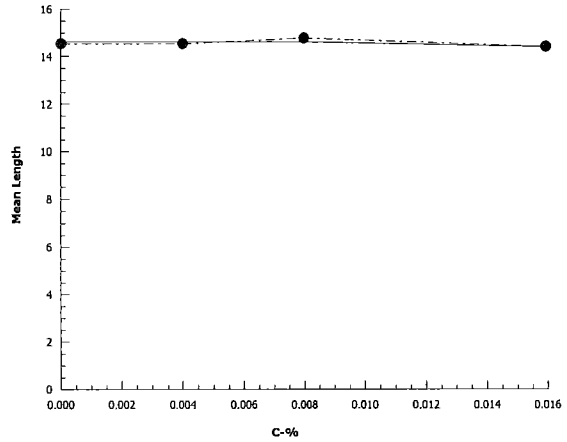
Mean Length Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	14.54	14.1	15	0.1631	0.3647	2.51%	0.0%
0.00399		5	14.54	14.4	14.6	0.03998	0.08941	0.61%	0.0%
0.00797		5	14.78	14.2	15	0.1497	0.3347	2.26%	-1.65%
0.01594		5	14.42	14.2	14.6	0.08	0.1789	1.24%	0.83%

Mean Length Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	14.3	14.1	14.8	15	14.5
0.00399		14.6	14.4	14.6	14.6	14.5
0.00797		15	14.8	15	14.2	14.9
0.01594		14.2	14.6	14.3	14.6	14.4

Graphics



CETIS Measurement Report

Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	19-3370-8155	**Test Type:**	Growth-Germination	**Analyst:**	
Start Date:	04 Mar-16 15:01	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	06 Mar-16 15:01	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Aquatic Bioassay Labs Collection	**Age:**	

Sample ID:	05-2320-3763	**Code:**	DCO0316.012klp	**Client:**	DCOR, LLC.
Sample Date:	03 Mar-16 07:00	**Material:**	Sample Water	**Project:**	
Receive Date:	03 Mar-16 12:30	**Source:**	Bioassay Report		
Sample Age:	32h (6.8 °C)	**Station:**	Platform Edith		

Dissolved Oxygen-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	6.4	1.318	11.48	6	6.8	0.4	0.5657	8.84%	0
0.00399		2	6.35	3.173	9.527	6.1	6.6	0.25	0.3536	5.57%	0
0.00797		2	6.5	3.959	9.041	6.3	6.7	0.2	0.2828	4.35%	0
0.01594		2	6.7	4.159	9.241	6.5	6.9	0.2	0.2828	4.22%	0
Overall		8	6.488			6	6.9				0 (0%)

pH-Units

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.00399		2	7.95	7.315	8.585	7.9	8	0.04999	0.0707	0.89%	0
0.00797		2	7.95	7.315	8.585	7.9	8	0.04999	0.0707	0.89%	0
0.01594		2	7.95	7.315	8.585	7.9	8	0.04999	0.0707	0.89%	0
Overall		8	7.938			7.9	8				0 (0%)

Salinity-ppt

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
0.00399		2	34	34	34	34	34	0	0	0.0%	0
0.00797		2	34	34	34	34	34	0	0	0.0%	0
0.01594		2	34	34	34	34	34	0	0	0.0%	0
Overall		8	34			34	34				0 (0%)

Temperature-°C

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
0.00399		2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
0.00797		2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
0.01594		2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
Overall		8	14.7			14.6	14.8				0 (0%)

Dissolved Oxygen-mg/L

C-%	Control Type	1	2
0	Negative Contr	6.8	6
0.00399		6.6	6.1
0.00797		6.7	6.3
0.01594		6.9	6.5

pH-Units

C-%	Control Type	1	2
0	Negative Contr	7.9	7.9
0.00399		8	7.9
0.00797		8	7.9
0.01594		8	7.9

Salinity-ppt

C-%	Control Type	1	2
0	Negative Contr	34	34
0.00399		34	34
0.00797		34	34
0.01594		34	34

Temperature-°C

C-%	Control Type	1	2
0	Negative Contr	14.6	14.8
0.00399		14.6	14.8
0.00797		14.6	14.8
0.01594		14.6	14.8

Aquatic Bioassay and Consulting Labs.
29 N. Olive Street
Ventura, CA 93001
Phone and Fax:(805) 643-5621
CHAIN OF CUSTODY RECORD

REPORT: e-mail to jrao@dcorllc.com
Fax (805) 535-2075
Company DCOR,LLC.
Address 290 Maple Court. Suite 290
Ventura CA. 93003
Contact Jay Rao at 805 535-2078

BILL TO:
P.O. #
Company: DCOR,LLC.
Address

PROJ. NO.

PROJECT NAME
Edith
Whole Effluent Toxicity Tests

SAMPLER'S SIGNATURE:
Print Name: JOSHUA STOVER

CONTAINER TYPES
A=Amber B=Brass G=Glass
P=Plastic V=Voa Vial O=Other

Remarks
8 Grab samples in 24 hours
Use EPA Method 600/R95/136

Grab Sample NO.	Date Sampled	Time Sampled	Comp	Grab	Sample Description	Matrix: Water	Soil	Sludge	Other	Container #	Container Type	Analysis	Red Abalone	Giant Kelp	Topsmelt				Remarks
1	3/2/16	10:00AM		X	Produced Water	X				1	P		X	X	X				Produced Water Temp: 13.2
2	3/2/16	1:00PM		X	Produced Water	X													WHEN TAKEN.
3	3/2/16	4:00PM		X	Produced Water	X													
4	3/2/16	7:00PM		X	Produced Water	X													
5	3/2/16	10:00PM		X	Produced Water	X													
6	3/3/16	1:00AM		X	Produced Water	X													
7	3/3/16	4:00AM		X	Produced Water	X													
8	3/3/16	7:00AM		X	Produced Water	X													

Temp. deg. C = 6.8°C
Chlorine (mg/L) = <0.1
NH3 (mg/L) = 7.0

CHECK ONE BOX
Dispose Samples X
Return Samples

Relinquished by :(Signature)	Date	Received by :(Signature)	Relinquished by :(Signature)	Date	Received by :(Signature)
	3-3			3-3-16	
Print Name: JOSHUA STOVER	Time 0800	Print Name: Lloyd Leonardo	Print Name: Lloyd Leonardo	Time 1230	Print Name: Lorena Marquez
Relinquished by :(Signature)	Date	Received by :(Signature)	Relinquished by :(Signature)	Date	Received by :(Signature)
Print Name:	Time	Print Name:	Print Name:	Time	Print Name:

Verified by Lead Operator:(Signature)
Print Name: Dean Mesnes
Date: 3-3-16
Time: 0700

Turn Around time

24Hr.			5 day	
48Hr			Standard	X
72Hr			other	

aquatic bioassay & consulting laboratories, inc

CHRONIC TOPSMELT SURVIVAL AND GROWTH BIOASSAY

DATE: 1 March - 2016

STANDARD TOXICANT: Copper Chloride

ENDPOINT: SURVIVAL

NOEC = 56.00 ug/l

EC25 = 97.25 ug/l
EC50 = 140.00 ug/l

ENDPOINT: GROWTH

NOEC = 100.00 ug/l

IC25 = 121.70 ug/l
IC50 = 172.00 ug/l

Yours very truly,

Scott Johnson
Laboratory Director

*34ppt

29 north olive st. ventura, ca 93001 (805) 643 5621 www.aquabio.org

CETIS Summary Report

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	10-4092-7508	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	01 Mar-16 15:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	08 Mar-16 13:30	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	01-6065-2464	**Code:**	TOPS030116	**Client:**	ABC Labs
Sample Date:	01 Mar-16 15:30	**Material:**	Copper chloride	**Project:**	REF TOX
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	NA	**Station:**	REF TOX		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
07-2094-1590	7d Survival Rate	56	100	74.83	23.1%		Dunnett Multiple Comparison Test
00-2795-7329	Mean Dry Biomass-mg	100	180	134.2	32.6%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
00-7210-0765	7d Survival Rate	EC5	32.2	0.05384	90.06		Linear Interpolation (ICPIN)
		EC10	59.3	2.658	113.8		
		EC15	71.95	12.49	122.1		
		EC20	84.6	22.32	126.2		
		EC25	97.25	32.14	130.2		
		EC40	123.3	78.94	148.4		
		EC50	140	102.5	167.3		
00-7005-5194	Mean Dry Biomass-mg	IC5	71.47	50.39	129		Linear Interpolation (ICPIN)
		IC10	86.93	56.37	136.1		
		IC15	101.6	57.59	143.5		
		IC20	111.6	60.87	155.3		
		IC25	121.7	64.02	165.5		
		IC40	151.9	73.44	203.1		
		IC50	172	114.9	226.5		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
00-7210-0765	7d Survival Rate	Control Resp	0.92	0.8 - NL	Yes	Passes Acceptability Criteria
07-2094-1590	7d Survival Rate	Control Resp	0.92	0.8 - NL	Yes	Passes Acceptability Criteria
00-2795-7329	Mean Dry Biomass-mg	Control Resp	0.8832	0.85 - NL	Yes	Passes Acceptability Criteria
00-7005-5194	Mean Dry Biomass-mg	Control Resp	0.8832	0.85 - NL	Yes	Passes Acceptability Criteria
07-2094-1590	7d Survival Rate	PMSD	0.2313	NL - 0.25	No	Passes Acceptability Criteria
00-2795-7329	Mean Dry Biomass-mg	PMSD	0.3263	NL - 0.5	No	Passes Acceptability Criteria

7d Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	0.92	0.784	1	0.8	1	0.04899	0.1095	11.91%	0.0%
56		5	0.84	0.6322	1	0.6	1	0.07483	0.1673	19.92%	8.7%
100		5	0.68	0.4579	0.9021	0.4	0.8	0.08	0.1789	26.31%	26.09%
180		5	0.24	0.03223	0.4478	0	0.4	0.07483	0.1673	69.72%	73.91%
320		5	0	0	0	0	0	0	0		100.0%
560		5	0	0	0	0	0	0	0		100.0%

Mean Dry Biomass-mg Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	0.8832	0.772	0.9944	0.812	1.02	0.04005	0.08956	10.14%	0.0%
56		5	0.9616	0.7365	1.187	0.808	1.262	0.08109	0.1813	18.86%	-8.88%
100		5	0.7912	0.4692	1.113	0.332	0.958	0.116	0.2593	32.78%	10.42%
180		5	0.4244	0.1221	0.7267	0	0.586	0.1089	0.2434	57.36%	51.95%
320		5	0	0	0	0	0	0	0		100.0%
560		5	0	0	0	0	0	0	0		100.0%

7d Survival Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	0.8	1	1	0.8
56		1	0.8	0.8	0.6	1
100		0.8	0.8	0.6	0.4	0.8
180		0	0.2	0.2	0.4	0.4
320		0	0	0	0	0
560		0	0	0	0	0

Mean Dry Biomass-mg Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.838	0.812	0.928	1.02	0.818
56		1.262	0.934	0.972	0.832	0.808
100		0.894	0.856	0.958	0.332	0.916
180		0	0.474	0.586	0.584	0.478
320		0	0	0	0	0
560		0	0	0	0	0

7d Survival Rate Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	5/5	4/5	5/5	5/5	4/5
56		5/5	4/5	4/5	3/5	5/5
100		4/5	4/5	3/5	2/5	4/5
180		0/5	1/5	1/5	2/5	2/5
320		0/5	0/5	0/5	0/5	0/5
560		0/5	0/5	0/5	0/5	0/5

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 07-2094-1590 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 19 Mar-16 23:00 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	23.1%	56	100	74.83	

Dunnett Multiple Comparison Test

Control	vs	C-µg/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		56	0.815	2.227	0.251	8	0.4070	CDF	Non-Significant Effect
		100*	2.41	2.227	0.251	8	0.0355	CDF	Significant Effect
		180*	6.616	2.227	0.251	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.653045	0.551015	3	17.36	<0.0001	Significant Effect
Error	0.5079427	0.03174642	16			
Total	2.160988		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	0.6976	11.34	0.8738	Equal Variances
Variances	Mod Levene Equality of Variance	0.1183	5.953	0.9476	Equal Variances
Variances	Levene Equality of Variance	0.2431	5.292	0.8650	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8895	0.866	0.0264	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.2199	0.2235	0.0123	Normal Distribution
Distribution	D'Agostino Skewness	1.096	2.576	0.2732	Normal Distribution
Distribution	D'Agostino Kurtosis	1.172	2.576	0.2412	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	2.575	9.21	0.2760	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.8767	3.878	0.0246	Normal Distribution

7d Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	0.92	0.784	1	1	0.8	1	0.04899	11.91%	0.0%
56		5	0.84	0.6322	1	0.8	0.6	1	0.07483	19.92%	8.7%
100		5	0.68	0.4579	0.9021	0.8	0.4	0.8	0.08	26.31%	26.09%
180		5	0.24	0.03223	0.4478	0.2	0	0.4	0.07483	69.72%	73.91%
320		5	0	0	0	0	0	0	0		100.0%
560		5	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.25	1.088	1.412	1.345	1.107	1.345	0.05833	10.43%	0.0%
56		5	1.158	0.9183	1.398	1.107	0.8861	1.345	0.08639	16.68%	7.35%
100		5	0.9784	0.7425	1.214	1.107	0.6847	1.107	0.085	19.43%	21.73%
180		5	0.5044	0.2671	0.7418	0.4636	0.2255	0.6847	0.08548	37.89%	59.64%
320		5	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	81.96%
560		5	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	81.96%

7d Survival Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	0.8	1	1	0.8
56		1	0.8	0.8	0.6	1
100		0.8	0.8	0.6	0.4	0.8
180		0	0.2	0.2	0.4	0.4
320		0	0	0	0	0
560		0	0	0	0	0

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-2094-1590	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Mar-16 23:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

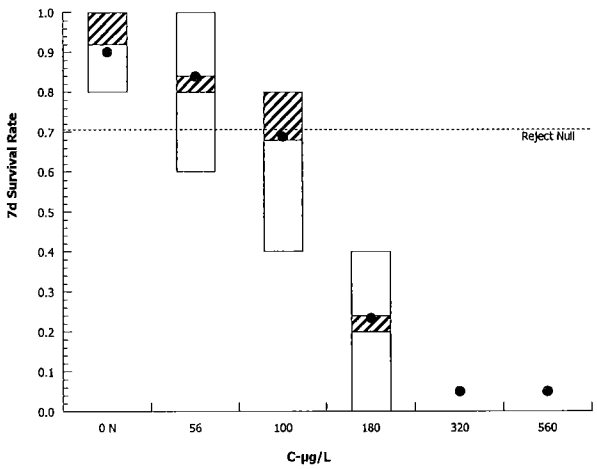
Angular (Corrected) Transformed Detail

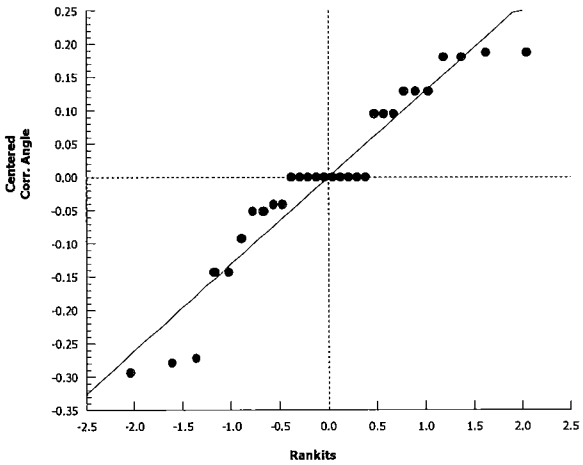
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.345	1.107	1.345	1.345	1.107
56		1.345	1.107	1.107	0.8861	1.345
100		1.107	1.107	0.8861	0.6847	1.107
180		0.2255	0.4636	0.4636	0.6847	0.6847
320		0.2255	0.2255	0.2255	0.2255	0.2255
560		0.2255	0.2255	0.2255	0.2255	0.2255

7d Survival Rate Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	5/5	4/5	5/5	5/5	4/5
56		5/5	4/5	4/5	3/5	5/5
100		4/5	4/5	3/5	2/5	4/5
180		0/5	1/5	1/5	2/5	2/5
320		0/5	0/5	0/5	0/5	0/5
560		0/5	0/5	0/5	0/5	0/5

Graphics





Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 00-2795-7329 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.8.7
Analyzed: 19 Mar-16 23:00 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	32.6%	100	180	134.2	

Dunnett Multiple Comparison Test

Control vs	C-µg/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control	56	-0.6059	2.227	0.288	8	0.9116	CDF	Non-Significant Effect
	100	0.711	2.227	0.288	8	0.4517	CDF	Non-Significant Effect
	180*	3.546	2.227	0.288	8	0.0036	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.8465877	0.2821959	3	6.743	0.0038	Significant Effect
Error	0.669648	0.041853	16			
Total	1.516236		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.881	11.34	0.2746	Equal Variances
Variances	Mod Levene Equality of Variance	0.2342	5.953	0.8708	Equal Variances
Variances	Levene Equality of Variance	0.7955	5.292	0.5141	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8959	0.866	0.0346	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.1522	0.2235	0.2603	Normal Distribution
Distribution	D'Agostino Skewness	2.224	2.576	0.0261	Normal Distribution
Distribution	D'Agostino Kurtosis	1.518	2.576	0.1291	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	7.25	9.21	0.0266	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.8571	3.878	0.0275	Normal Distribution

Mean Dry Biomass-mg Summary

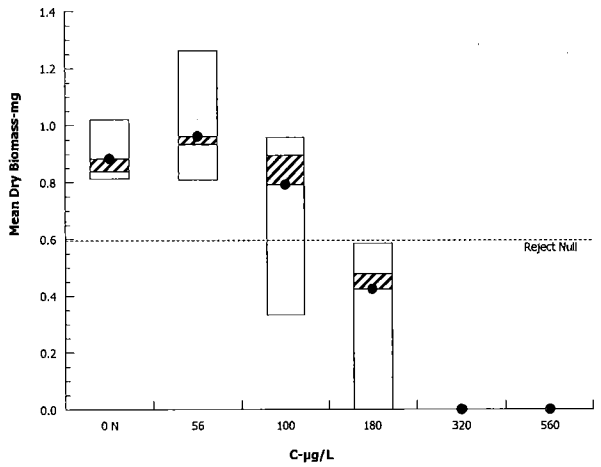
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	0.8832	0.772	0.9944	0.838	0.812	1.02	0.04005	10.14%	0.0%
56		5	0.9616	0.7365	1.187	0.934	0.808	1.262	0.08109	18.86%	-8.88%
100		5	0.7912	0.4692	1.113	0.894	0.332	0.958	0.116	32.78%	10.42%
180		5	0.4244	0.1221	0.7267	0.478	0	0.586	0.1089	57.36%	51.95%
320		5	0	0	0	0	0	0	0		100.0%
560		5	0	0	0	0	0	0	0		100.0%

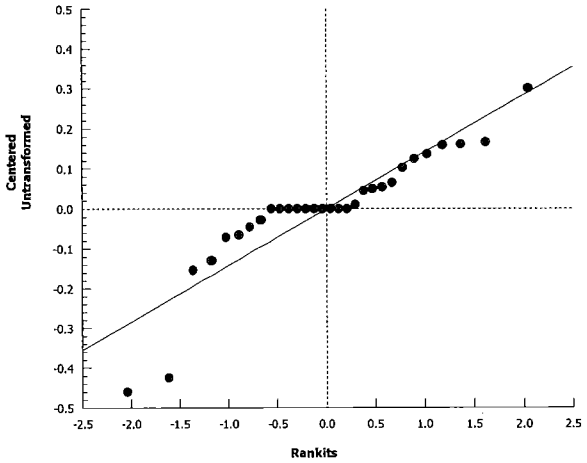
Mean Dry Biomass-mg Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.838	0.812	0.928	1.02	0.818
56		1.262	0.934	0.972	0.832	0.808
100		0.894	0.856	0.958	0.332	0.916
180		0	0.474	0.586	0.584	0.478
320		0	0	0	0	0
560		0	0	0	0	0

Pacific Topsmelt 7-d Survival and Growth Test				Aquatic Bioassay & Consulting Labs, Inc.	
Analysis ID:	00-2795-7329	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Mar-16 23:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Report Date: 22 Mar-16 14:31 (p 1 of 3)
Test Code: TOPS030116 | 06-7695-5203

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	00-7210-0765	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Mar-16 23:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Point Estimates

Level	µg/L	95% LCL	95% UCL
EC5	32.2	0.05384	90.06
EC10	59.3	2.658	113.8
EC15	71.95	12.49	122.1
EC20	84.6	22.32	126.2
EC25	97.25	32.14	130.2
EC40	123.3	78.94	148.4
EC50	140	102.5	167.3

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	0.92	0.8	1	0.04899	0.1095	11.91%	0.0%	23	25
56		5	0.84	0.6	1	0.07483	0.1673	19.92%	8.7%	21	25
100		5	0.68	0.4	0.8	0.08	0.1789	26.31%	26.09%	17	25
180		5	0.24	0	0.4	0.07483	0.1673	69.72%	73.91%	6	25
320		5	0	0	0	0	0		100.0%	0	25
560		5	0	0	0	0	0		100.0%	0	25

7d Survival Rate Detail

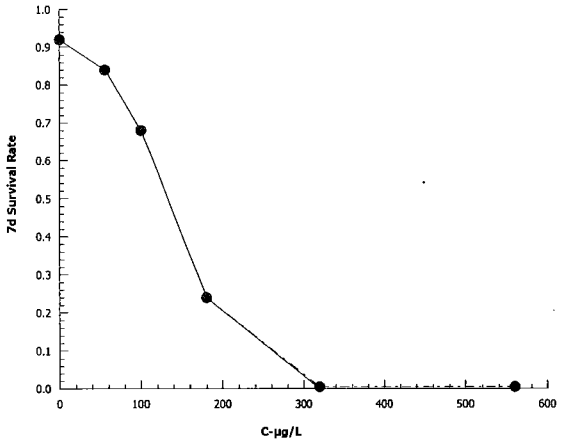
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	0.8	1	1	0.8
56		1	0.8	0.8	0.6	1
100		0.8	0.8	0.6	0.4	0.8
180		0	0.2	0.2	0.4	0.4
320		0	0	0	0	0
560		0	0	0	0	0

7d Survival Rate Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	5/5	4/5	5/5	5/5	4/5
56		5/5	4/5	4/5	3/5	5/5
100		4/5	4/5	3/5	2/5	4/5
180		0/5	1/5	1/5	2/5	2/5
320		0/5	0/5	0/5	0/5	0/5
560		0/5	0/5	0/5	0/5	0/5

Pacific Topsmelt 7-d Survival and Growth Test				Aquatic Bioassay & Consulting Labs, Inc.	
Analysis ID:	00-7210-0765	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Mar-16 23:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	00-7005-5194	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Mar-16 23:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	326709	280	Yes	Two-Point Interpolation

Point Estimates

Level	µg/L	95% LCL	95% UCL
IC5	71.47	50.39	129
IC10	86.93	56.37	136.1
IC15	101.6	57.59	143.5
IC20	111.6	60.87	155.3
IC25	121.7	64.02	165.5
IC40	151.9	73.44	203.1
IC50	172	114.9	226.5

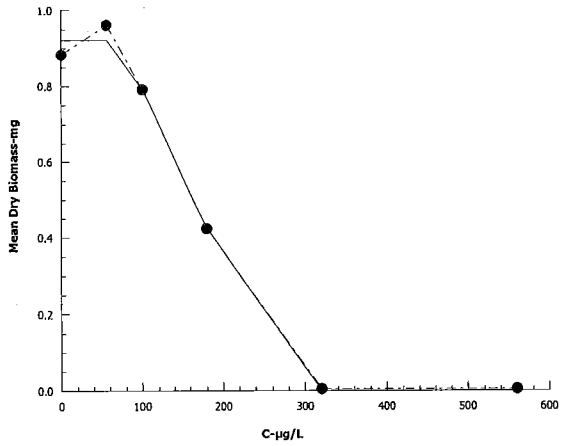
Mean Dry Biomass-mg Summary

			Calculated Variate						
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	0.8832	0.812	1.02	0.04005	0.08956	10.14%	0.0%
56		5	0.9616	0.808	1.262	0.08109	0.1813	18.86%	-8.88%
100		5	0.7912	0.332	0.958	0.116	0.2593	32.78%	10.42%
180		5	0.4244	0	0.586	0.1089	0.2434	57.36%	51.95%
320		5	0	0	0	0	0		100.0%
560		5	0	0	0	0	0		100.0%

Mean Dry Biomass-mg Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.838	0.812	0.928	1.02	0.818
56		1.262	0.934	0.972	0.832	0.808
100		0.894	0.856	0.958	0.332	0.916
180		0	0.474	0.586	0.584	0.478
320		0	0	0	0	0
560		0	0	0	0	0

Graphics



CETIS Measurement Report

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	10-4092-7508	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	01 Mar-16 15:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	08 Mar-16 13:30	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	01-6065-2464	**Code:**	TOPS030116	**Client:**	ABC Labs
Sample Date:	01 Mar-16 15:30	**Material:**	Copper chloride	**Project:**	REF TOX
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	NA	**Station:**	REF TOX		

Dissolved Oxygen-mg/L

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	8	6.65	6.477	6.823	6.4	7	0.07319	0.207	3.11%	0
56		8	6.613	6.259	6.966	6	7.2	0.1493	0.4224	6.39%	0
100		8	6.563	6.28	6.845	6.1	7	0.1194	0.3378	5.15%	0
180		8	6.55	6.275	6.825	6.1	7	0.1165	0.3295	5.03%	0
320		7	6.386	6.106	6.665	6.1	6.8	0.1143	0.3024	4.74%	0
560		2	6.7	5.429	7.971	6.6	6.8	0.09999	0.1414	2.11%	0
Overall		41	6.577			6	7.2				0 (0%)

pH-Units

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	8	7.663	7.6	7.725	7.5	7.7	0.02631	0.0744	0.97%	0
56		8	7.775	7.736	7.814	7.7	7.8	0.01637	0.0463	0.6%	0
100		8	7.788	7.758	7.817	7.7	7.8	0.01251	0.03537	0.45%	0
180		8	7.763	7.7	7.825	7.6	7.8	0.02631	0.07441	0.96%	0
320		7	7.8	7.747	7.853	7.7	7.9	0.02182	0.05774	0.74%	0
560		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
Overall		41	7.781			7.5	7.9				0 (0%)

Salinity-ppt

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	8	34	34	34	34	34	0	0	0.0%	0
56		8	34	34	34	34	34	0	0	0.0%	0
100		8	34	34	34	34	34	0	0	0.0%	0
180		8	34	34	34	34	34	0	0	0.0%	0
320		7	34	34	34	34	34	0	0	0.0%	0
560		2	34	34	34	34	34	0	0	0.0%	0
Overall		41	34			34	34				0 (0%)

Temperature-°C

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	8	21	21	21	21	21	0	0	0.0%	0
56		8	21	21	21	21	21	0	0	0.0%	0
100		8	21	21	21	21	21	0	0	0.0%	0
180		8	21	21	21	21	21	0	0	0.0%	0
320		7	21	21	21	21	21	0	0	0.0%	0
560		2	21	21	21	21	21	0	0	0.0%	0
Overall		41	21			21	21				0 (0%)

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

C-µg/L	Control Type	1	2	3	4	5	6	7	8
0	Negative Contr	6.5	6.6	7	6.4	6.5	6.7	6.9	6.6
56		6.5	6.5	6.9	6	6.2	6.5	7.2	7.1
100		6.4	6.6	6.9	6.3	6.1	6.3	6.9	7
180		6.4	6.6	6.8	6.4	6.1	6.2	6.9	7
320		6.8	6.6	6.7	6.2	6.1	6.2	6.1	
560		6.8	6.6						

pH-Units

C-µg/L	Control Type	1	2	3	4	5	6	7	8
0	Negative Contr	7.7	7.5	7.6	7.7	7.7	7.7	7.7	7.7
56		7.8	7.7	7.8	7.8	7.8	7.7	7.8	7.8
100		7.8	7.7	7.8	7.8	7.8	7.8	7.8	7.8
180		7.8	7.7	7.8	7.6	7.8	7.8	7.8	7.8
320		7.9	7.7	7.8	7.8	7.8	7.8	7.8	
560		7.9	7.9						

Salinity-ppt

C-µg/L	Control Type	1	2	3	4	5	6	7	8
0	Negative Contr	34	34	34	34	34	34	34	34
56		34	34	34	34	34	34	34	34
100		34	34	34	34	34	34	34	34
180		34	34	34	34	34	34	34	34
320		34	34	34	34	34	34	34	
560		34	34						

Temperature-°C

C-µg/L	Control Type	1	2	3	4	5	6	7	8
0	Negative Contr	21	21	21	21	21	21	21	21
56		21	21	21	21	21	21	21	21
100		21	21	21	21	21	21	21	21
180		21	21	21	21	21	21	21	21
320		21	21	21	21	21	21	21	
560		21	21						

aquatic bioassay & consulting laboratories, inc

CHRONIC ABALONE DEVELOPMENT BIOASSAY

DATE: 4 March 2016

STANDARD TOXICANT: Zinc

NOEC = 56.00 ug/l

EC25 = 62.59 ug/l
EC50 = 75.06 ug/l

Yours very truly,

Scott Johnson
Laboratory Director

29 north olive st. ventura, ca 93001 (805) 643 5621 www.aquabio.org

CETIS Summary Report

Report Date: 23 Mar-16 09:54 (p 1 of 1)
Test Code: ABS030416 | 18-6772-8560

Red Abalone Larval Development Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	18-0275-6698	**Test Type:**	Development	**Analyst:**	
Start Date:	04 Mar-16 12:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	06 Mar-16 12:30	**Species:**	Haliotis rufescens	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Cultured Abalone	**Age:**	

Sample ID:	16-5427-3108	**Code:**	ABS030416	**Client:**	Internal Lab
Sample Date:	04 Mar-16 12:30	**Material:**	Zinc	**Project:**	REF TOX
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	NA	**Station:**	REF TOX		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
09-0241-5996	Proportion Normal	56	100	74.83	5.02%		Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
17-7405-4941	Proportion Normal	EC5	40	29.5	65.23		Linear Interpolation (ICPIN)
		EC10	51.76	37.77	62.75		
		EC15	57.6	44.07	63.25		
		EC20	60.09	52.1	65.41		
		EC25	62.59	56.05	67.57		
		EC40	70.07	64.84	74.06		
		EC50	75.06	70.7	78.38		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
09-0241-5996	Proportion Normal	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
17-7405-4941	Proportion Normal	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
09-0241-5996	Proportion Normal	NOEL	56	NL - 56	No	Above Acceptability Criteria
09-0241-5996	Proportion Normal	PMSD	0.05023	NL - 0.2	No	Passes Acceptability Criteria

Proportion Normal Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	1	1	1	1	1	0	0	0.0%	0.0%
18		5	1	1	1	1	1	0	0	0.0%	0.0%
32		5	0.984	0.9396	1	0.92	1	0.016	0.03578	3.64%	1.6%
56		5	0.882	0.7436	1	0.76	1	0.04984	0.1114	12.64%	11.8%
100		5	0	0	0	0	0	0	0		100.0%
180		5	0	0	0	0	0	0	0		100.0%

Proportion Normal Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	1
18		1	1	1	1	1
32		1	1	1	1	0.92
56		1	1	0.76	0.81	0.84
100		0	0	0	0	0
180		0	0	0	0	0

Proportion Normal Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	100/100	100/100	100/100	100/100	100/100
18		100/100	100/100	100/100	100/100	100/100
32		100/100	100/100	100/100	100/100	92/100
56		100/100	100/100	76/100	81/100	84/100
100		0/100	0/100	0/100	0/100	0/100
180		0/100	0/100	0/100	0/100	0/100

CETIS Analytical Report

Test Code: ABS030416 | 18-6772-8560

Red Abalone Larval Development Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 09-0241-5996 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.8.7
Analyzed: 23 Mar-16 9:54 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	5.02%	56	100	74.83	

Steel Many-One Rank Sum Test

Control vs	C-µg/L	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Negative Control	18	27.5	17	1	8	0.7500	Asymp	Non-Significant Effect
	32	25	17	1	8	0.5314	Asymp	Non-Significant Effect
	56	20	17	1	8	0.1365	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2043124	0.06810415	3	4.361	0.0200	Significant Effect
Error	0.2498622	0.01561639	16			
Total	0.4541747		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	3.868	5.953	0.0380	Equal Variances
Variances	Levene Equality of Variance	23.4	5.292	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8427	0.866	0.0040	Non-normal Distribution
Distribution	Kolmogorov-Smirnov D	0.3	0.2235	<0.0001	Non-normal Distribution
Distribution	D'Agostino Skewness	0.5905	2.576	0.5549	Normal Distribution
Distribution	D'Agostino Kurtosis	1.296	2.576	0.1949	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	2.029	9.21	0.3626	Normal Distribution
Distribution	Anderson-Darling A2 Normality	1.835	3.878	<0.0001	Non-normal Distribution

Proportion Normal Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	1	1	1	1	1	1	0	0.0%	0.0%
18		5	1	1	1	1	1	1	0	0.0%	0.0%
32		5	0.984	0.9396	1	1	0.92	1	0.016	3.64%	1.6%
56		5	0.882	0.7436	1	0.84	0.76	1	0.04984	12.64%	11.8%
100		5	0	0	0	0	0	0	0		100.0%
180		5	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.521	1.521	1.521	1.521	1.521	1.521	0	0.0%	0.0%
18		5	1.521	1.521	1.521	1.521	1.521	1.521	0	0.0%	0.0%
32		5	1.473	1.342	1.605	1.521	1.284	1.521	0.04735	7.19%	3.11%
56		5	1.276	0.9948	1.557	1.159	1.059	1.521	0.1012	17.74%	16.1%
100		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.71%
180		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.71%

Proportion Normal Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	1
18		1	1	1	1	1
32		1	1	1	1	0.92
56		1	1	0.76	0.81	0.84
100		0	0	0	0	0
180		0	0	0	0	0

Red Abalone Larval Development Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	09-0241-5996	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Mar-16 9:54	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

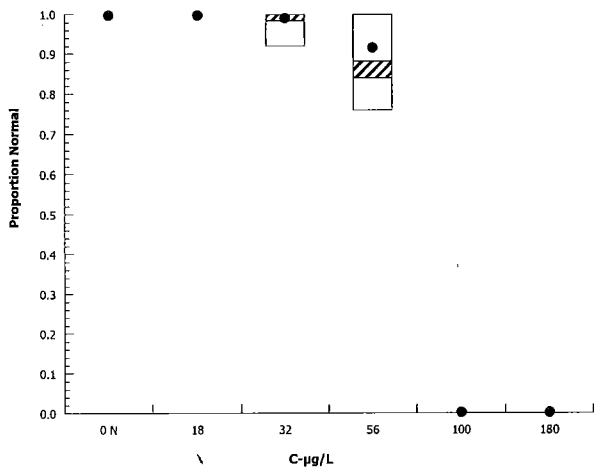
Angular (Corrected) Transformed Detail

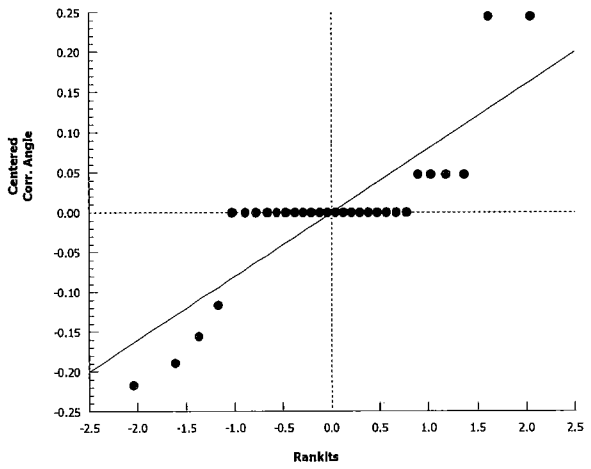
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.521	1.521	1.521	1.521	1.521
18		1.521	1.521	1.521	1.521	1.521
32		1.521	1.521	1.521	1.521	1.284
56		1.521	1.521	1.059	1.12	1.159
100		0.05002	0.05002	0.05002	0.05002	0.05002
180		0.05002	0.05002	0.05002	0.05002	0.05002

Proportion Normal Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	100/100	100/100	100/100	100/100	100/100
18		100/100	100/100	100/100	100/100	100/100
32		100/100	100/100	100/100	100/100	92/100
56		100/100	100/100	76/100	81/100	84/100
100		0/100	0/100	0/100	0/100	0/100
180		0/100	0/100	0/100	0/100	0/100

Graphics





CETIS Analytical Report

Test Code: ABS030416 | 18-6772-8560

Red Abalone Larval Development Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	17-7405-4941	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Mar-16 9:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Point Estimates

Level	µg/L	95% LCL	95% UCL
EC5	40	29.5	65.23
EC10	51.76	37.77	62.75
EC15	57.6	44.07	63.25
EC20	60.09	52.1	65.41
EC25	62.59	56.05	67.57
EC40	70.07	64.84	74.06
EC50	75.06	70.7	78.38

Proportion Normal Summary

			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	1	1	1	0	0	0.0%	0.0%	500	500
18		5	1	1	1	0	0	0.0%	0.0%	500	500
32		5	0.984	0.92	1	0.016	0.03578	3.64%	1.6%	492	500
56		5	0.882	0.76	1	0.04984	0.1114	12.64%	11.8%	441	500
100		5	0	0	0	0	0		100.0%	0	500
180		5	0	0	0	0	0		100.0%	0	500

Proportion Normal Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	1
18		1	1	1	1	1
32		1	1	1	1	0.92
56		1	1	0.76	0.81	0.84
100		0	0	0	0	0
180		0	0	0	0	0

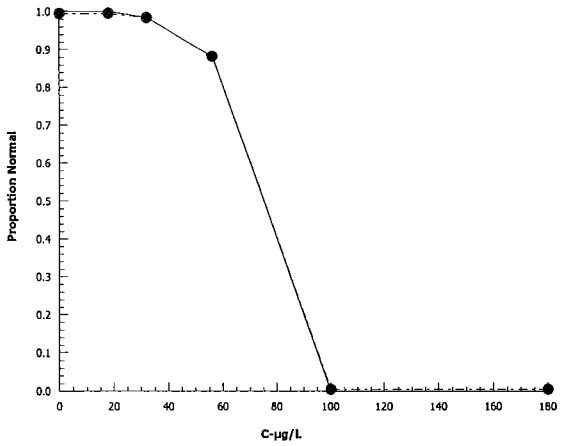
Proportion Normal Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	100/100	100/100	100/100	100/100	100/100
18		100/100	100/100	100/100	100/100	100/100
32		100/100	100/100	100/100	100/100	92/100
56		100/100	100/100	76/100	81/100	84/100
100		0/100	0/100	0/100	0/100	0/100
180		0/100	0/100	0/100	0/100	0/100

Analyst:_____ QA:_____

Red Abalone Larval Development Test				Aquatic Bioassay & Consulting Labs, Inc.	
Analysis ID:	17-7405-4941	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Mar-16 9:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Measurement Report

Red Abalone Larval Development Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	18-0275-6698	**Test Type:**	Development	**Analyst:**	
Start Date:	04 Mar-16 12:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	06 Mar-16 12:30	**Species:**	Haliotis rufescens	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Cultured Abalone	**Age:**	

Sample ID:	16-5427-3108	**Code:**	ABS030416	**Client:**	Internal Lab
Sample Date:	04 Mar-16 12:30	**Material:**	Zinc	**Project:**	REF TOX
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	NA	**Station:**	REF TOX		

Parameter Acceptability Criteria

Parameter	Min	Max	Acceptability Limits	Overlap	Decision
Salinity-ppt	34	34	32 - 36	Yes	Results Within Limits
Temperature-°C	14.1	14.3	14 - 16	Yes	Results Within Limits

Dissolved Oxygen-mg/L

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	6.6	4.059	9.141	6.4	6.8	0.2	0.2828	4.29%	0
18		2	6.75	6.115	7.385	6.7	6.8	0.04999	0.07069	1.05%	0
32		2	6.75	6.115	7.385	6.7	6.8	0.04999	0.07069	1.05%	0
56		2	6.75	6.115	7.385	6.7	6.8	0.04999	0.07069	1.05%	0
100		2	6.75	6.115	7.385	6.7	6.8	0.04999	0.07069	1.05%	0
180		2	6.75	6.115	7.385	6.7	6.8	0.04999	0.07069	1.05%	0
Overall		12	6.725			6.4	6.8				0 (0%)

pH-Units

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.75	7.115	8.385	7.7	7.8	0.05001	0.07072	0.91%	0
18		2	7.8	7.787	7.813	7.8	7.8	0	0	0.0%	0
32		2	7.8	7.787	7.813	7.8	7.8	0	0	0.0%	0
56		2	7.8	7.787	7.813	7.8	7.8	0	0	0.0%	0
100		2	7.8	7.787	7.813	7.8	7.8	0	0	0.0%	0
180		2	7.8	7.787	7.813	7.8	7.8	0	0	0.0%	0
Overall		12	7.792			7.7	7.8				0 (0%)

Salinity-ppt

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
18		2	34	34	34	34	34	0	0	0.0%	0
32		2	34	34	34	34	34	0	0	0.0%	0
56		2	34	34	34	34	34	0	0	0.0%	0
100		2	34	34	34	34	34	0	0	0.0%	0
180		2	34	34	34	34	34	0	0	0.0%	0
Overall		12	34			34	34				0 (0%)

Temperature-°C

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.2	12.93	15.47	14.1	14.3	0.1	0.1414	1.0%	0
18		2	14.2	12.93	15.47	14.1	14.3	0.1	0.1414	1.0%	0
32		2	14.2	12.93	15.47	14.1	14.3	0.1	0.1414	1.0%	0
56		2	14.2	12.93	15.47	14.1	14.3	0.1	0.1414	1.0%	0
100		2	14.2	12.93	15.47	14.1	14.3	0.1	0.1414	1.0%	0
180		2	14.2	12.93	15.47	14.1	14.3	0.1	0.1414	1.0%	0
Overall		12	14.2			14.1	14.3				0 (0%)

Dissolved Oxygen-mg/L

C-µg/L	Control Type	1	2
0	Negative Contr	6.8	6.4
18		6.8	6.7
32		6.8	6.7
56		6.8	6.7
100		6.8	6.7
180		6.8	6.7

pH-Units

C-µg/L	Control Type	1	2
0	Negative Contr	7.8	7.7
18		7.8	7.8
32		7.8	7.8
56		7.8	7.8
100		7.8	7.8
180		7.8	7.8

Salinity-ppt

C-µg/L	Control Type	1	2
0	Negative Contr	34	34
18		34	34
32		34	34
56		34	34
100		34	34
180		34	34

Temperature-°C

C-µg/L	Control Type	1	2
0	Negative Contr	14.1	14.3
18		14.1	14.3
32		14.1	14.3
56		14.1	14.3
100		14.1	14.3
180		14.1	14.3

aquatic bioassay & consulting laboratories, inc

CHRONIC KELP GERMINATION & GROWTH BIOASSAY

DATE: 4 March - 16

STANDARD TOXICANT: Copper Chloride

ENDPOINT: GERMINATION

NOEC = 32.00 ug/l

EC25 = 118.60 ug/l
EC50 = 146.30 ug/l

ENDPOINT: GROWTH-LENGTH

NOEC = 32.00 ug/l

IC25 = 84.24 ug/l
IC50 = 190.50 ug/l

Yours very truly,

Scott Johnson
Laboratory Director

29 north olive st. ventura, ca 93001 (805) 643 5621 www.aquabio.org

CETIS Summary Report

Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	15-4490-8220	**Test Type:**	Growth-Germination	**Analyst:**	
Start Date:	04 Mar-16 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	06 Mar-16 15:00	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable
Duration:	48h	**Source:**	David Gutoff	**Age:**	

Sample ID:	12-7352-1763	**Code:**	KLP030416	**Client:**	Internal Lab
Sample Date:	04 Mar-16 15:00	**Material:**	Copper chloride	**Project:**	
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	NA	**Station:**	REF TOX		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
06-3530-3716	Germination Rate	32	100	56.57	4.1%		Dunnett Multiple Comparison Test
03-4705-4601	Mean Length	32	100	56.57	4.67%		Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
20-6150-7043	Germination Rate	EC5	70.15	40.61	105.1		Linear Interpolation (ICPIN)
		EC10	101.9	78.55	106.4		
		EC15	107.5	101.4	111.7		
		EC20	113	107.4	117.1		
		EC25	118.6	113.3	122.6		
		EC40	135.2	130.7	138.8		
		EC50	146.3	141.5	149.7		
09-2246-1682	Mean Length	IC5	40.94	37.03	44.57		Linear Interpolation (ICPIN)
		IC10	51.76	46.81	57.1		
		IC15	62.59	55.74	70.65		
		IC20	73.42	64.71	84.85		
		IC25	84.24	73.74	98.53		
		IC40	145.3	114.5	164.8		
		IC50	190.5	180.9	198.2		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
06-3530-3716	Germination Rate	Control Resp	0.934	0.7 - NL	Yes	Passes Acceptability Criteria
20-6150-7043	Germination Rate	Control Resp	0.934	0.7 - NL	Yes	Passes Acceptability Criteria
03-4705-4601	Mean Length	Control Resp	14.46	10 - NL	Yes	Passes Acceptability Criteria
09-2246-1682	Mean Length	Control Resp	14.46	10 - NL	Yes	Passes Acceptability Criteria
03-4705-4601	Mean Length	NOEL	32	NL - 35	No	Passes Acceptability Criteria
06-3530-3716	Germination Rate	PMSD	0.04101	NL - 0.2	No	Passes Acceptability Criteria
03-4705-4601	Mean Length	PMSD	0.04672	NL - 0.2	No	Passes Acceptability Criteria

Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Germination Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	0.934	0.9054	0.9626	0.91	0.96	0.0103	0.02302	2.47%	0.0%
5.6		5	0.932	0.9116	0.9524	0.91	0.95	0.007348	0.01643	1.76%	0.21%
10		5	0.932	0.9037	0.9603	0.91	0.96	0.0102	0.0228	2.45%	0.21%
18		5	0.944	0.9273	0.9607	0.93	0.96	0.006	0.01342	1.42%	-1.07%
32		5	0.928	0.8959	0.9601	0.9	0.97	0.01158	0.02588	2.79%	0.64%
100		5	0.858	0.8088	0.9072	0.79	0.89	0.01772	0.03962	4.62%	8.14%
180		5	0.184	0.1316	0.2364	0.11	0.21	0.01887	0.04219	22.93%	80.3%
320		5	0	0	0	0	0	0	0		100.0%

Mean Length Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	14.46	14.27	14.65	14.2	14.6	0.06782	0.1517	1.05%	0.0%
5.6		5	14.54	14.31	14.77	14.3	14.7	0.08124	0.1817	1.25%	-0.55%
10		5	14.32	14.14	14.5	14.1	14.5	0.06633	0.1483	1.04%	0.97%
18		5	14.2	13.86	14.54	13.8	14.5	0.1225	0.2739	1.93%	1.8%
32		5	14.6	14.02	15.18	14.3	15.4	0.2074	0.4637	3.18%	-0.97%
100		5	9.82	8.712	10.93	8.8	10.9	0.3992	0.8927	9.09%	32.09%
180		5	7.84	7.267	8.413	7.3	8.4	0.2064	0.4615	5.89%	45.78%
320		5	0	0	0	0	0	0	0		100.0%

Germination Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.91	0.94	0.96	0.95	0.91
5.6		0.95	0.94	0.92	0.94	0.91
10		0.93	0.96	0.91	0.95	0.91
18		0.93	0.96	0.93	0.95	0.95
32		0.92	0.92	0.97	0.9	0.93
100		0.88	0.79	0.89	0.86	0.87
180		0.21	0.19	0.11	0.21	0.2
320		0	0	0	0	0

Mean Length Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	14.2	14.5	14.5	14.6	14.5
5.6		14.4	14.7	14.7	14.6	14.3
10		14.4	14.3	14.1	14.3	14.5
18		14.1	14.2	14.4	13.8	14.5
32		15.4	14.6	14.4	14.3	14.3
100		8.8	10.5	10.9	9.8	9.1
180		8.2	7.5	7.3	7.8	8.4
320		0	0	0	0	0

Germination Rate Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	91/100	94/100	96/100	95/100	91/100
5.6		95/100	94/100	92/100	94/100	91/100
10		93/100	96/100	91/100	95/100	91/100
18		93/100	96/100	93/100	95/100	95/100
32		92/100	92/100	97/100	90/100	93/100
100		88/100	79/100	89/100	86/100	87/100
180		21/100	19/100	11/100	21/100	20/100
320		0/100	0/100	0/100	0/100	0/100

Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 06-3530-3716 **Endpoint:** Germination Rate **CETIS Version:** CETISv1.8.7
Analyzed: 25 Mar-16 15:58 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	4.1%	32	100	56.57	

Dunnett Multiple Comparison Test

Control vs	C-µg/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control	5.6	0.1881	2.407	0.072	8	0.8001	CDF	Non-Significant Effect
	10	0.1355	2.407	0.072	8	0.8173	CDF	Non-Significant Effect
	18	-0.6397	2.407	0.072	8	0.9663	CDF	Non-Significant Effect
	32	0.3564	2.407	0.072	8	0.7390	CDF	Non-Significant Effect
	100*	4.249	2.407	0.072	8	0.0006	CDF	Significant Effect
	180*	29.14	2.407	0.072	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.178535	0.5297558	6	236.1	<0.0001	Significant Effect
Error	0.06282156	0.002243627	28			
Total	3.241356		34			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	2.829	16.81	0.8300	Equal Variances
Variances	Mod Levene Equality of Variance	0.1723	3.812	0.9814	Equal Variances
Variances	Levene Equality of Variance	0.3004	3.528	0.9314	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9713	0.9146	0.4806	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.1283	0.1723	0.1484	Normal Distribution
Distribution	D'Agostino Skewness	0.9998	2.576	0.3174	Normal Distribution
Distribution	D'Agostino Kurtosis	0.3566	2.576	0.7214	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	1.127	9.21	0.5693	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.4904	3.878	0.2243	Normal Distribution

Germination Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	0.934	0.9054	0.9626	0.94	0.91	0.96	0.0103	2.47%	0.0%
5.6		5	0.932	0.9116	0.9524	0.94	0.91	0.95	0.007348	1.76%	0.21%
10		5	0.932	0.9037	0.9603	0.93	0.91	0.96	0.0102	2.45%	0.21%
18		5	0.944	0.9273	0.9607	0.95	0.93	0.96	0.006	1.42%	-1.07%
32		5	0.928	0.8959	0.9601	0.92	0.9	0.97	0.01158	2.79%	0.64%
100		5	0.858	0.8088	0.9072	0.87	0.79	0.89	0.01772	4.62%	8.14%
180		5	0.184	0.1316	0.2364	0.2	0.11	0.21	0.01887	22.93%	80.3%
320		5	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.314	1.256	1.372	1.323	1.266	1.369	0.02089	3.56%	0.0%
5.6		5	1.308	1.268	1.349	1.323	1.266	1.345	0.01447	2.47%	0.43%
10		5	1.31	1.252	1.368	1.303	1.266	1.369	0.02083	3.56%	0.31%
18		5	1.333	1.297	1.37	1.345	1.303	1.369	0.01309	2.2%	-1.46%
32		5	1.303	1.234	1.373	1.284	1.249	1.397	0.02491	4.27%	0.81%
100		5	1.187	1.12	1.254	1.202	1.095	1.233	0.02421	4.56%	9.69%
180		5	0.441	0.3684	0.5135	0.4636	0.3381	0.476	0.02614	13.25%	66.44%
320		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.19%

Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	06-3530-3716	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Mar-16 15:58	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Germination Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.91	0.94	0.96	0.95	0.91
5.6		0.95	0.94	0.92	0.94	0.91
10		0.93	0.96	0.91	0.95	0.91
18		0.93	0.96	0.93	0.95	0.95
32		0.92	0.92	0.97	0.9	0.93
100		0.88	0.79	0.89	0.86	0.87
180		0.21	0.19	0.11	0.21	0.2
320		0	0	0	0	0

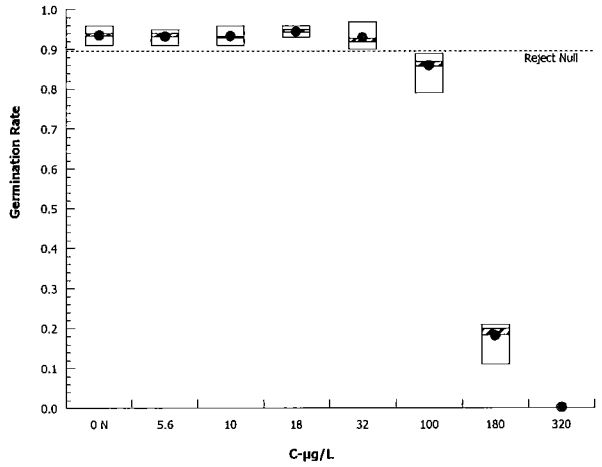
Angular (Corrected) Transformed Detail

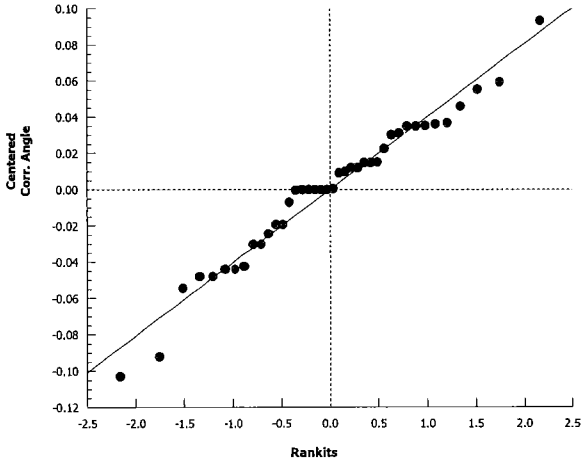
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.266	1.323	1.369	1.345	1.266
5.6		1.345	1.323	1.284	1.323	1.266
10		1.303	1.369	1.266	1.345	1.266
18		1.303	1.369	1.303	1.345	1.345
32		1.284	1.284	1.397	1.249	1.303
100		1.217	1.095	1.233	1.187	1.202
180		0.476	0.451	0.3381	0.476	0.4636
320		0.05002	0.05002	0.05002	0.05002	0.05002

Germination Rate Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	91/100	94/100	96/100	95/100	91/100
5.6		95/100	94/100	92/100	94/100	91/100
10		93/100	96/100	91/100	95/100	91/100
18		93/100	96/100	93/100	95/100	95/100
32		92/100	92/100	97/100	90/100	93/100
100		88/100	79/100	89/100	86/100	87/100
180		21/100	19/100	11/100	21/100	20/100
320		0/100	0/100	0/100	0/100	0/100

Graphics





Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 03-4705-4601 **Endpoint:** Mean Length **CETIS Version:** CETISv1.8.7
Analyzed: 25 Mar-16 15:58 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	4.67%	32	100	56.57	

Steel Many-One Rank Sum Test

Control vs	C-µg/L	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Negative Control	5.6	31.5	16	1	8	0.9815	Asymp	Non-Significant Effect
	10	20.5	16	1	8	0.2486	Asymp	Non-Significant Effect
	18	19	16	2	8	0.1478	Asymp	Non-Significant Effect
	32	27.5	16	1	8	0.8571	Asymp	Non-Significant Effect
	100*	15	16	0	8	0.0222	Asymp	Significant Effect
	180*	15	16	0	8	0.0222	Asymp	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	233.8549	38.97581	6	198	<0.0001	Significant Effect
Error	5.511996	0.196857	28			
Total	239.3669		34			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	20.17	16.81	0.0026	Unequal Variances
Variances	Mod Levene Equality of Variance	6.707	3.812	0.0004	Unequal Variances
Variances	Levene Equality of Variance	4.496	3.528	0.0026	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9596	0.9146	0.2224	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.1383	0.1723	0.0882	Normal Distribution
Distribution	D'Agostino Skewness	0.7033	2.576	0.4818	Normal Distribution
Distribution	D'Agostino Kurtosis	1.708	2.576	0.0876	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus	3.413	9.21	0.1815	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.7298	3.878	0.0569	Normal Distribution

Mean Length Summary

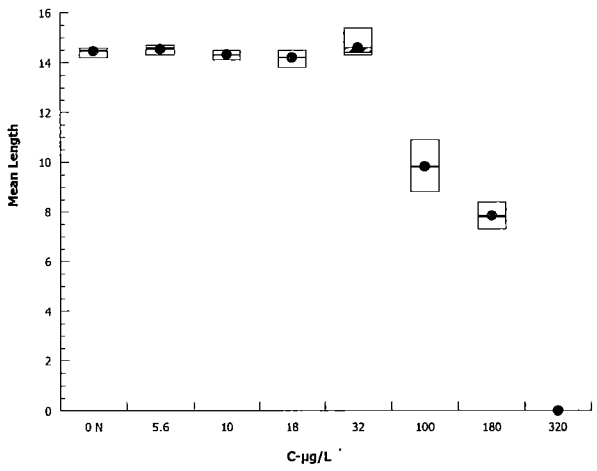
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	14.46	14.27	14.65	14.5	14.2	14.6	0.06782	1.05%	0.0%
5.6		5	14.54	14.31	14.77	14.6	14.3	14.7	0.08124	1.25%	-0.55%
10		5	14.32	14.14	14.5	14.3	14.1	14.5	0.06633	1.04%	0.97%
18		5	14.2	13.86	14.54	14.2	13.8	14.5	0.1225	1.93%	1.8%
32		5	14.6	14.02	15.18	14.4	14.3	15.4	0.2074	3.18%	-0.97%
100		5	9.82	8.712	10.93	9.8	8.8	10.9	0.3992	9.09%	32.09%
180		5	7.84	7.267	8.413	7.8	7.3	8.4	0.2064	5.89%	45.78%
320		5	0	0	0	0	0	0	0		100.0%

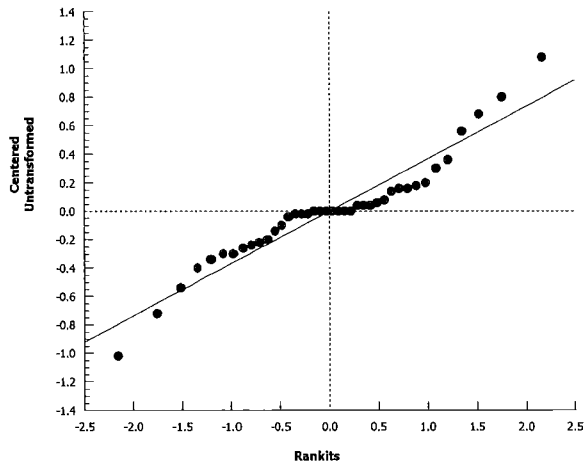
Mean Length Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	14.2	14.5	14.5	14.6	14.5
5.6		14.4	14.7	14.7	14.6	14.3
10		14.4	14.3	14.1	14.3	14.5
18		14.1	14.2	14.4	13.8	14.5
32		15.4	14.6	14.4	14.3	14.3
100		8.8	10.5	10.9	9.8	9.1
180		8.2	7.5	7.3	7.8	8.4
320		0	0	0	0	0

Macrocystis Germination and Germ Tube Growth Test				Aquatic Bioassay & Consulting Labs, Inc.	
Analysis ID:	03-4705-4601	**Endpoint:**	Mean Length	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Mar-16 15:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	20-6150-7043	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Mar-16 15:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Point Estimates

Level	µg/L	95% LCL	95% UCL
EC5	70.15	40.61	105.1
EC10	101.9	78.55	106.4
EC15	107.5	101.4	111.7
EC20	113	107.4	117.1
EC25	118.6	113.3	122.6
EC40	135.2	130.7	138.8
EC50	146.3	141.5	149.7

Germination Rate Summary

								Calculated Variate(A/B)			
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	0.934	0.91	0.96	0.0103	0.02302	2.47%	0.0%	467	500
5.6		5	0.932	0.91	0.95	0.007348	0.01643	1.76%	0.21%	466	500
10		5	0.932	0.91	0.96	0.0102	0.0228	2.45%	0.21%	466	500
18		5	0.944	0.93	0.96	0.006	0.01342	1.42%	-1.07%	472	500
32		5	0.928	0.9	0.97	0.01158	0.02588	2.79%	0.64%	464	500
100		5	0.858	0.79	0.89	0.01772	0.03962	4.62%	8.14%	429	500
180		5	0.184	0.11	0.21	0.01887	0.04219	22.93%	80.3%	92	500
320		5	0	0	0	0	0		100.0%	0	500

Germination Rate Detail

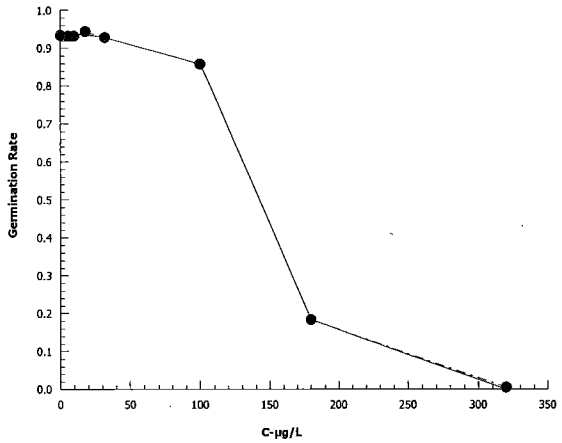
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.91	0.94	0.96	0.95	0.91
5.6		0.95	0.94	0.92	0.94	0.91
10		0.93	0.96	0.91	0.95	0.91
18		0.93	0.96	0.93	0.95	0.95
32		0.92	0.92	0.97	0.9	0.93
100		0.88	0.79	0.89	0.86	0.87
180		0.21	0.19	0.11	0.21	0.2
320		0	0	0	0	0

Germination Rate Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	91/100	94/100	96/100	95/100	91/100
5.6		95/100	94/100	92/100	94/100	91/100
10		93/100	96/100	91/100	95/100	91/100
18		93/100	96/100	93/100	95/100	95/100
32		92/100	92/100	97/100	90/100	93/100
100		88/100	79/100	89/100	86/100	87/100
180		21/100	19/100	11/100	21/100	20/100
320		0/100	0/100	0/100	0/100	0/100

Macrocystis Germination and Germ Tube Growth Test				Aquatic Bioassay & Consulting Labs, Inc.	
Analysis ID:	20-6150-7043	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Mar-16 15:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	09-2246-1682	**Endpoint:**	Mean Length	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Mar-16 15:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	336343	280	Yes	Two-Point Interpolation

Point Estimates

Level	µg/L	95% LCL	95% UCL
IC5	40.94	37.03	44.57
IC10	51.76	46.81	57.1
IC15	62.59	55.74	70.65
IC20	73.42	64.71	84.85
IC25	84.24	73.74	98.53
IC40	145.3	114.5	164.8
IC50	190.5	180.9	198.2

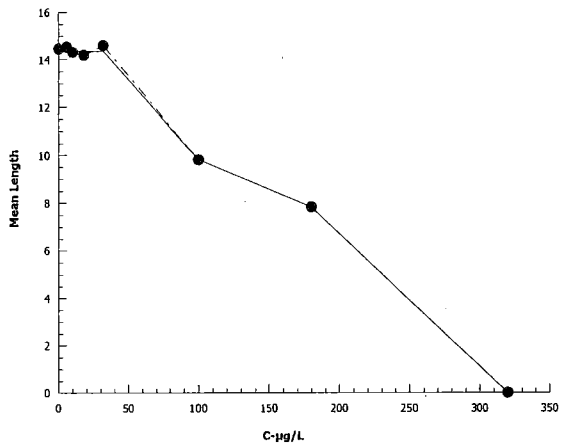
Mean Length Summary

			Calculated Variate						
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	14.46	14.2	14.6	0.06782	0.1517	1.05%	0.0%
5.6		5	14.54	14.3	14.7	0.08124	0.1817	1.25%	-0.55%
10		5	14.32	14.1	14.5	0.06633	0.1483	1.04%	0.97%
18		5	14.2	13.8	14.5	0.1225	0.2739	1.93%	1.8%
32		5	14.6	14.3	15.4	0.2074	0.4637	3.18%	-0.97%
100		5	9.82	8.8	10.9	0.3992	0.8927	9.09%	32.09%
180		5	7.84	7.3	8.4	0.2064	0.4615	5.89%	45.78%
320		5	0	0	0	0	0		100.0%

Mean Length Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	14.2	14.5	14.5	14.6	14.5
5.6		14.4	14.7	14.7	14.6	14.3
10		14.4	14.3	14.1	14.3	14.5
18		14.1	14.2	14.4	13.8	14.5
32		15.4	14.6	14.4	14.3	14.3
100		8.8	10.5	10.9	9.8	9.1
180		8.2	7.5	7.3	7.8	8.4
320		0	0	0	0	0

Graphics



CETIS Measurement Report

Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	15-4490-8220	**Test Type:**	Growth-Germination	**Analyst:**	
Start Date:	04 Mar-16 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	06 Mar-16 15:00	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable
Duration:	48h	**Source:**	David Gutoff	**Age:**	

Sample ID:	12-7352-1763	**Code:**	KLP030416	**Client:**	Internal Lab
Sample Date:	04 Mar-16 15:00	**Material:**	Copper chloride	**Project:**	
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	NA	**Station:**	REF TOX		

Dissolved Oxygen-mg/L

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	6.4	1.318	11.48	6	6.8	0.4	0.5657	8.84%	0
5.6		2	6.45	2.003	10.9	6.1	6.8	0.35	0.495	7.67%	0
10		2	6.5	1.418	11.58	6.1	6.9	0.4	0.5657	8.7%	0
18		2	6.35	1.903	10.8	6	6.7	0.35	0.495	7.8%	0
32		2	6.55	3.373	9.727	6.3	6.8	0.25	0.3536	5.4%	0
100		2	6.4	1.318	11.48	6	6.8	0.4	0.5657	8.84%	0
180		2	6.45	0.7322	12.17	6	6.9	0.45	0.6364	9.87%	0
320		2	6.5	2.688	10.31	6.2	6.8	0.3	0.4243	6.53%	0
Overall		16	6.45			6	6.9				0 (0%)

pH-Units

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
5.6		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
10		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
18		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
32		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
180		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
320		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
Overall		16	7.9			7.9	7.9				0 (0%)

Salinity-ppt

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	34	34	34	34	34	0	0	0.0%	0
5.6		2	34	34	34	34	34	0	0	0.0%	0
10		2	34	34	34	34	34	0	0	0.0%	0
18		2	34	34	34	34	34	0	0	0.0%	0
32		2	34	34	34	34	34	0	0	0.0%	0
100		2	34	34	34	34	34	0	0	0.0%	0
180		2	34	34	34	34	34	0	0	0.0%	0
320		2	34	34	34	34	34	0	0	0.0%	0
Overall		16	34			34	34				0 (0%)

Temperature-°C

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
5.6		2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
10		2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
18		2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
32		2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
100		2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
180		2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
320		2	14.7	13.43	15.97	14.6	14.8	0.09999	0.1414	0.96%	0
Overall		16	14.7			14.6	14.8				0 (0%)

Dissolved Oxygen-mg/L

C-µg/L	Control Type	1	2
0	Negative Contr	6.8	6
5.6		6.8	6.1
10		6.9	6.1
18		6.7	6
32		6.8	6.3
100		6.8	6
180		6.9	6
320		6.8	6.2

pH-Units

C-µg/L	Control Type	1	2
0	Negative Contr	7.9	7.9
5.6		7.9	7.9
10		7.9	7.9
18		7.9	7.9
32		7.9	7.9
100		7.9	7.9
180		7.9	7.9
320		7.9	7.9

Salinity-ppt

C-µg/L	Control Type	1	2
0	Negative Contr	34	34
5.6		34	34
10		34	34
18		34	34
32		34	34
100		34	34
180		34	34
320		34	34

Temperature-°C

C-µg/L	Control Type	1	2
0	Negative Contr	14.6	14.8
5.6		14.6	14.8
10		14.6	14.8
18		14.6	14.8
32		14.6	14.8
100		14.6	14.8
180		14.6	14.8
320		14.6	14.8