aquatic bioassay & consulting laboratories, inc

July 15, 2021

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.:	Produced Water (Platform Edith)
DATE RECEIVED:	10 June - 2021
ABC LAB. NO.:	DCO0621.099

CHRONIC ABALONE LARVAL DEVELOPMENT BIOASSAY

IWC = 5481:1

TST RESULT

LARVAL DEVELOPMENT = PASS % EFFECT = 0.65 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 14 Jul-21 08:11 (p 1 of 1)
Test Code/ID: DCO0621.099abs / 07-3656-2058

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

Batch ID:	03-6939-1878	**Test Type:**	Development	**Analyst:**			
Start Date:	11 Jun-21 12:31	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Reconstituted Water		
Ending Date:	13 Jun-21 13:00	**Species:**	Haliotis rufescens	**Brine:**	Not Applicable		
Test Length:	48h	**Taxon:**	Gastropod	**Source:**	Cultured Abalone	**Age:**	

Sample ID:	17-5960-3762	**Code:**	DCO0621.099abs	**Project:**	Platform Edith Whole Effluent Toxicity
Sample Date:	10 Jun-21 04:00	**Material:**	Sample Water	**Source:**	Bioassay Report
Receipt Date:	10 Jun-21 16:30	**CAS (PC):**		**Station:**	Produced Water (Edith)
Sample Age:	33h (10.5 °C)	**Client:**	DCOR, LLC.		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-0991-8665	Proportion Normal	TST-Welch's t Test	<1.0E-05	0.01825% passed proportion normal	1

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
19-0991-8665	Proportion Normal	Control Resp	0.928	0.8	>>	Yes	Passes Criteria

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	0.9280	0.9019	0.9541	0.9000	1.0000	0.0115	0.0365	3.93%	0.00%
0.01825		10	0.9220	0.8997	0.9443	0.9000	1.0000	0.0099	0.0312	3.38%	0.65%

Proportion Normal Detail

MD5: E380C1C28AF500CDA8D7CC577C839270

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	0.9500	0.9800	0.9000	0.9000	0.9200	0.9100	0.9200	0.9000	0.9000
0.01825		0.9000	0.9000	0.9000	0.9200	0.9100	0.9200	0.9100	0.9500	1.0000	0.9100

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	100/100	95/100	98/100	90/100	90/100	92/100	91/100	92/100	90/100	90/100
0.01825		90/100	90/100	90/100	92/100	91/100	92/100	91/100	95/100	100/100	91/100

CETIS Analytical Report

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

Analysis ID:	19-0991-8665	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.7
Analyzed:	14 Jul-21 8:10	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	14 Jul-21 8:08	**MD5 Hash:**	E380C1C28AF500CDA8D7CC577C839270	**Editor ID:**	000-189-126-0

Batch ID:	03-6939-1878	**Test Type:**	Development	**Analyst:**	
Start Date:	11 Jun-21 12:31	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Reconstituted Water
Ending Date:	13 Jun-21 13:00	**Species:**	Haliotis rufescens	**Brine:**	Not Applicable
Test Length:	48h	**Taxon:**	Gastropod	**Source:**	Cultured Abalone **Age:**

Sample ID:	17-5960-3762	**Code:**	DCO0621.099abs	**Project:**	Platform Edith Whole Effluent Toxicity
Sample Date:	10 Jun-21 04:00	**Material:**	Sample Water	**Source:**	Bioassay Report
Receipt Date:	10 Jun-21 16:30	**CAS (PC):**		**Station:**	Produced Water (Edith)
Sample Age:	33h (10.5 °C)	**Client:**	DCOR, LLC.		

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	0.01825% passed proportion normal endpoint

TST-Welch's t Test

Control	vs	Conc-%	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		0.01825*	9.124	1.74	17	CDF	<1.0E-05	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	Upper	Overlap	Decision
Control Resp	0.928	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001062	0.001062	1	0.1362	0.7164	Non-Significant Effect
Error	0.140377	0.0077987	18			
Total	0.141439		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Levene Equality of Variance Test	0.4556	8.285	0.5082	Equal Variances
	Mod Levene Equality of Variance Test	0.2629	8.285	0.6144	Equal Variances
	Variance Ratio F Test	1.246	6.541	0.7484	Equal Variances
Distribution	Anderson-Darling A2 Test	2.664	3.878	<1.0E-05	Non-Normal Distribution
	D'Agostino Kurtosis Test	2.004	2.576	0.0451	Normal Distribution
	D'Agostino Skewness Test	3.178	2.576	0.0015	Non-Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	14.11	9.21	0.0009	Non-Normal Distribution
	Kolmogorov-Smirnov D Test	0.3143	0.2235	1.5E-05	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.7088	0.866	5.0E-05	Non-Normal Distribution

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	0.9280	0.9019	0.9541	0.9150	0.9000	1.0000	0.0115	3.93%	0.00%
0.01825		10	0.9220	0.8997	0.9443	0.9100	0.9000	1.0000	0.0099	3.38%	0.65%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	1.3130	1.2460	1.3790	1.2750	1.2490	1.5210	0.0294	7.09%	0.00%
0.01825		10	1.2980	1.2380	1.3580	1.2660	1.2490	1.5210	0.0264	6.42%	1.11%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	0.9500	0.9800	0.9000	0.9000	0.9200	0.9100	0.9200	0.9000	0.9000
0.01825		0.9000	0.9000	0.9000	0.9200	0.9100	0.9200	0.9100	0.9500	1.0000	0.9100

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

Analysis ID:	19-0991-8665	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.7
Analyzed:	14 Jul-21 8:10	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	14 Jul-21 8:08	**MD5 Hash:**	E380C1C28AF500CDA8D7CC577C839270	**Editor ID:**	000-189-126-0

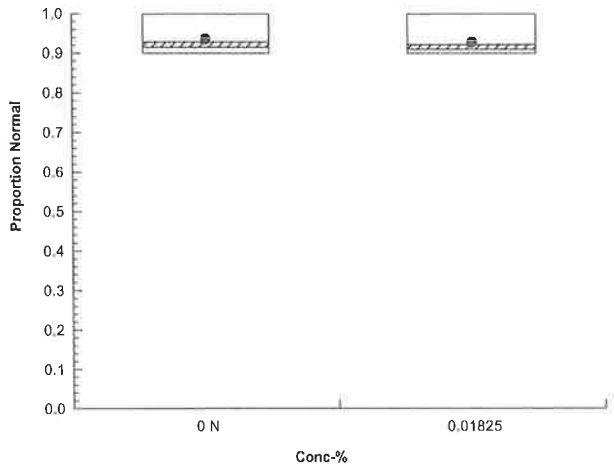
Angular (Corrected) Transformed Detail

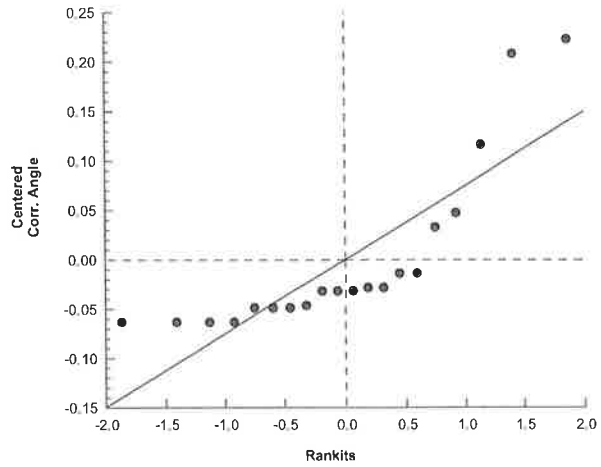
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.5210	1.3450	1.4290	1.2490	1.2490	1.2840	1.2660	1.2840	1.2490	1.2490
0.01825		1.2490	1.2490	1.2490	1.2840	1.2660	1.2840	1.2660	1.3450	1.5210	1.2660

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	100/100	95/100	98/100	90/100	90/100	92/100	91/100	92/100	90/100	90/100
0.01825		90/100	90/100	90/100	92/100	91/100	92/100	91/100	95/100	100/100	91/100

Graphics





CETIS Measurement Report

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

Batch ID:	03-6939-1878	**Test Type:**	Development	**Analyst:**		
Start Date:	11 Jun-21 12:31	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Reconstituted Water	
Ending Date:	13 Jun-21 13:00	**Species:**	Haliotis rufescens	**Brine:**	Not Applicable	
Test Length:	48h	**Taxon:**	Gastropod	**Source:**	Cultured Abalone	**Age:**

Sample ID:	17-5960-3762	**Code:**	DCO0621.099abs	**Project:**	Platform Edith Whole Effluent Toxicity
Sample Date:	10 Jun-21 04:00	**Material:**	Sample Water	**Source:**	Bioassay Report
Receipt Date:	10 Jun-21 16:30	**CAS (PC):**		**Station:**	Produced Water (Edith)
Sample Age:	33h (10.5 °C)	**Client:**	DCOR, LLC.		

Parameter Acceptability Criteria

Parameter	Min	Max	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
Salinity	34	34	32	36	Yes	Passes Criteria
Temperature	15.2	15.2	14	16	Yes	Passes Criteria

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	8.65	6.744	10.56	8.5	8.8	0.1061	0.2121	2.45%	0
0.01825		2	8.75	6.844	10.66	8.6	8.9	0.1061	0.2121	2.42%	0
Overall		4	8.7	8.409	8.991	8.5	8.9	0.09129	0.1826	2.10%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.75	7.115	8.385	7.7	7.8	0.03536	0.07072	0.91%	0
0.01825		2	7.85	7.215	8.485	7.8	7.9	0.03535	0.07071	0.90%	0
Overall		4	7.8	7.67	7.93	7.7	7.9	0.04082	0.08165	1.05%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	34	34	34	34	34	0	0	0.00%	0
0.01825		2	34	34	34	34	34	0	0	0.00%	0
Overall		4	34	34	34	34	34	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	15.2	15.19	15.21	15.2	15.2	0	0	0.00%	0
0.01825		2	15.2	15.19	15.21	15.2	15.2	0	0	0.00%	0
Overall		4	15.2	15.2	15.2	15.2	15.2	0	0	0.00%	0 (0%)

Red Abalone Larval Development Test

Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		8.8					
0.01825				8.9					
0	N	2		8.5					
0.01825				8.6					

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.8					
0.01825				7.9					
0	N	2		7.7					
0.01825				7.8					

Salinity-ppt

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		34					
0.01825				34					
0	N	2		34					
0.01825				34					

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		15.2					
0.01825				15.2					
0	N	2		15.2					
0.01825				15.2					

aquatic bioassay & consulting laboratories, inc

July 15, 2021

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.:	Produced Water (Platform Edith)
DATE RECEIVED:	10 June - 2021
ABC LAB. NO.:	DCO0621.099

CHRONIC KELP GERMINATION AND GROWTH BIOASSAY

IWC = 5481:1

TST RESULT

GERMINATION = PASS % EFFECT = -2.73 %

TUBE LENGTH = PASS % EFFECT = 0.53 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 15 Jul-21 08:29 (p 1 of 1)
Test Code/ID: DCO0621.099klp / 15-0247-1934

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

Batch ID:	04-3432-8680	**Test Type:**	Growth-Germination	**Analyst:**	
Start Date:	11 Jun-21 13:01	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Jun-21 13:01	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable
Test Length:	48h	**Taxon:**	Ochrophyta	**Source:**	Ventura Dive **Age:**

Sample ID:	11-1840-3887	**Code:**	DCO0621.099klp	**Project:**	Platform Edith Whole Effluent Toxicity
Sample Date:	10 Jun-21 04:00	**Material:**	Sample Water	**Source:**	Bioassay Report
Receipt Date:	10 Jun-21 16:30	**CAS (PC):**		**Station:**	Produced Water (Platform Edith)
Sample Age:	33h (10.5 °C)	**Client:**	DCOR, LLC.		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
05-9587-8526	Germination Rate	TST-Welch's t Test	<1.0E-05	0.01825% passed germination rate	1
10-4033-5101	Mean Length	TST-Welch's t Test	<1.0E-05	0.01825% passed mean length	1

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
05-9587-8526	Germination Rate	Control Resp	0.915	0.7	>>	Yes	Passes Criteria
10-4033-5101	Mean Length	Control Resp	13.11	10	>>	Yes	Passes Criteria

Germination Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	0.9150	0.9047	0.9253	0.9000	0.9400	0.0045	0.0143	1.57%	0.00%
0.01825		10	0.9400	0.9261	0.9539	0.9100	0.9700	0.0061	0.0194	2.07%	-2.73%

Mean Length Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	13.11	13.06	13.16	13	13.2	0.02333	0.07379	0.56%	0.00%
0.01825		10	13.04	12.97	13.11	12.9	13.2	0.03055	0.09661	0.74%	0.53%

Germination Rate Detail

MD5: ECB99F91AB0C20BB9F973D1D52C29925

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	0.9100	0.9300	0.9000	0.9000	0.9400	0.9200	0.9100	0.9300	0.9000	0.9100
0.01825		0.9300	0.9600	0.9400	0.9200	0.9700	0.9300	0.9600	0.9100	0.9500	0.9300

Mean Length Detail

MD5: C7D5C6EE30E9F66959022C2ACF37C8BD

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	13.1	13	13.1	13.2	13.1	13.1	13	13.2	13.1	13.2
0.01825		13.1	12.9	13.2	12.9	13	13.1	13.1	13	13.1	13

Germination Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	91/100	93/100	90/100	90/100	94/100	92/100	91/100	93/100	90/100	91/100
0.01825		93/100	96/100	94/100	92/100	97/100	93/100	96/100	91/100	95/100	93/100

CETIS Analytical Report

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

Analysis ID:	05-9587-8526	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:29	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	15 Jul-21 8:27	**MD5 Hash:**	ECB99F91AB0C20BB9F973D1D52C29925	**Editor ID:**	000-189-126-0

Batch ID:	04-3432-8680	**Test Type:**	Growth-Germination	**Analyst:**	
Start Date:	11 Jun-21 13:01	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Jun-21 13:01	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable
Test Length:	48h	**Taxon:**	Ochrophyta	**Source:**	Ventura Dive **Age:**

Sample ID:	11-1840-3887	**Code:**	DCO0621.099klp	**Project:**	Platform Edith Whole Effluent Toxicity
Sample Date:	10 Jun-21 04:00	**Material:**	Sample Water	**Source:**	Bioassay Report
Receipt Date:	10 Jun-21 16:30	**CAS (PC):**		**Station:**	Produced Water (Platform Edith)
Sample Age:	33h (10.5 °C)	**Client:**	DCOR, LLC.		

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	0.01825% passed germination rate endpoint

TST-Welch's t Test

Control	vs	Conc-%	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		0.01825*	25.04	1.782	12	CDF	<1.0E-05	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.915	0.7	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0127291	0.0127291	1	10.26	0.0049	Significant Effect
Error	0.0223222	0.0012401	18			
Total	0.0350513		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Levene Equality of Variance Test	2.996	8.285	0.1006	Equal Variances
	Mod Levene Equality of Variance Test	2.072	8.285	0.1672	Equal Variances
	Variance Ratio F Test	2.578	6.541	0.1746	Equal Variances
Distribution	Anderson-Darling A2 Test	0.5559	3.878	0.1550	Normal Distribution
	D'Agostino Kurtosis Test	0.5146	2.576	0.6068	Normal Distribution
	D'Agostino Skewness Test	0.8018	2.576	0.4227	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	0.9077	9.21	0.6352	Normal Distribution
	Kolmogorov-Smirnov D Test	0.1624	0.2235	0.1809	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9525	0.866	0.4058	Normal Distribution

Germination Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	0.9150	0.9047	0.9253	0.9100	0.9000	0.9400	0.0045	1.57%	0.00%
0.01825		10	0.9400	0.9261	0.9539	0.9350	0.9100	0.9700	0.0061	2.07%	-2.73%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	1.2760	1.2570	1.2950	1.2660	1.2490	1.3230	0.0083	2.06%	0.00%
0.01825		10	1.3260	1.2960	1.3570	1.3130	1.2660	1.3970	0.0134	3.19%	-3.95%

Germination Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	0.9100	0.9300	0.9000	0.9000	0.9400	0.9200	0.9100	0.9300	0.9000	0.9100
0.01825		0.9300	0.9600	0.9400	0.9200	0.9700	0.9300	0.9600	0.9100	0.9500	0.9300

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

Analysis ID:	05-9587-8526	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:29	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	15 Jul-21 8:27	**MD5 Hash:**	ECB99F91AB0C20BB9F973D1D52C29925	**Editor ID:**	000-189-126-0

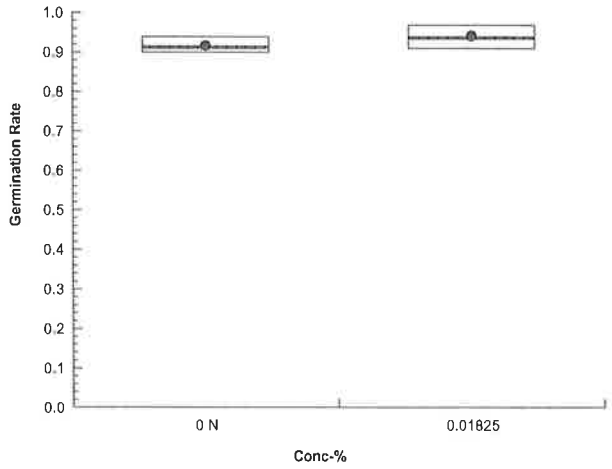
Angular (Corrected) Transformed Detail

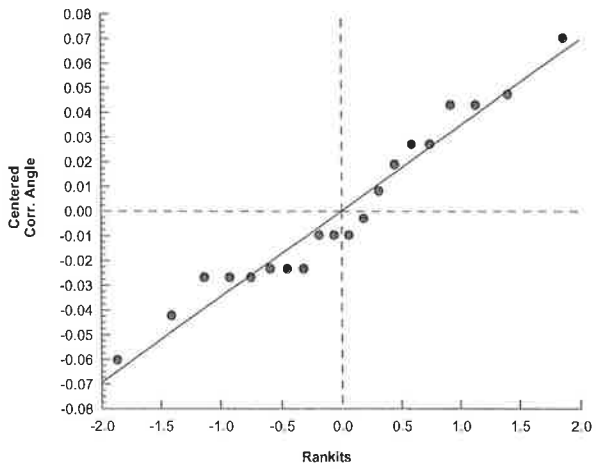
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.2660	1.3030	1.2490	1.2490	1.3230	1.2840	1.2660	1.3030	1.2490	1.2660
0.01825		1.3030	1.3690	1.3230	1.2840	1.3970	1.3030	1.3690	1.2660	1.3450	1.3030

Germination Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	91/100	93/100	90/100	90/100	94/100	92/100	91/100	93/100	90/100	91/100
0.01825		93/100	96/100	94/100	92/100	97/100	93/100	96/100	91/100	95/100	93/100

Graphics





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

Analysis ID:	10-4033-5101	**Endpoint:**	Mean Length	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:29	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	15 Jul-21 8:27	**MD5 Hash:**	C7D5C6EE30E9F66959022C2ACF37C8B	**Editor ID:**	000-189-126-0

Batch ID:	04-3432-8680	**Test Type:**	Growth-Germination	**Analyst:**	
Start Date:	11 Jun-21 13:01	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Jun-21 13:01	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable
Test Length:	48h	**Taxon:**	Ochrophyta	**Source:**	Ventura Dive **Age:**

Sample ID:	11-1840-3887	**Code:**	DCO0621.099klp	**Project:**	Platform Edith Whole Effluent Toxicity
Sample Date:	10 Jun-21 04:00	**Material:**	Sample Water	**Source:**	Bioassay Report
Receipt Date:	10 Jun-21 16:30	**CAS (PC):**		**Station:**	Produced Water (Platform Edith)
Sample Age:	33h (10.5 °C)	**Client:**	DCOR, LLC.		

Data Transform	Alt Hyp	TST_b	Comparison Result
Untransformed	C*b < T	0.75	0.01825% passed mean length endpoint

TST-Welch's t Test

Control	vs	Conc-%	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		0.01825*	91.1	1.761	14	CDF	<1.0E-05	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
Control Resp	13.11	10	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0245001	0.0245001	1	3.316	0.0853	Non-Significant Effect
Error	0.133	0.0073889	18			
Total	0.1575		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Levene Equality of Variance Test	1.527	8.285	0.2324	Equal Variances
	Mod Levene Equality of Variance Test	1.761	8.285	0.2011	Equal Variances
	Variance Ratio F Test	1.714	6.541	0.4343	Equal Variances
Distribution	Anderson-Darling A2 Test	0.572	3.878	0.1414	Normal Distribution
	D'Agostino Kurtosis Test	0.5933	2.576	0.5530	Normal Distribution
	D'Agostino Skewness Test	0.2484	2.576	0.8038	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	0.4137	9.21	0.8132	Normal Distribution
	Kolmogorov-Smirnov D Test	0.1634	0.2235	0.1742	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9431	0.866	0.2742	Normal Distribution

Mean Length Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	13.11	13.06	13.16	13.1	13	13.2	0.02334	0.56%	0.00%
0.01825		10	13.04	12.97	13.11	13.05	12.9	13.2	0.03055	0.74%	0.53%

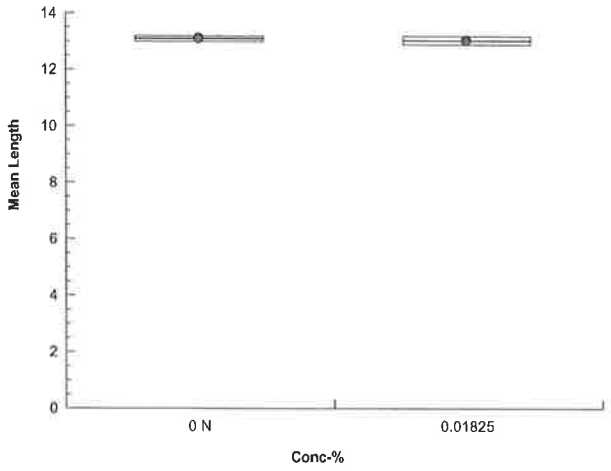
Mean Length Detail

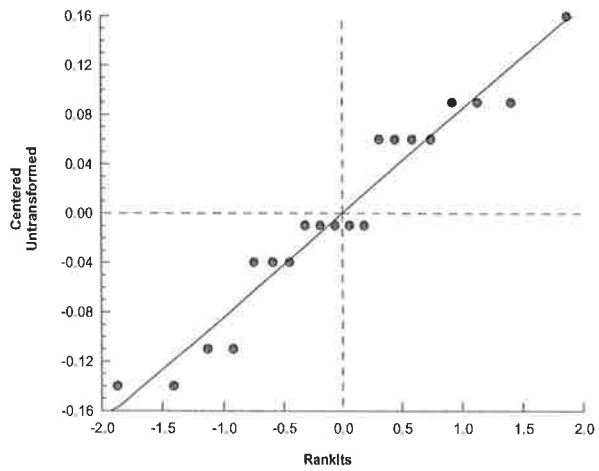
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	13.1	13	13.1	13.2	13.1	13.1	13	13.2	13.1	13.2
0.01825		13.1	12.9	13.2	12.9	13	13.1	13.1	13	13.1	13

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

Analysis ID:	10-4033-5101	**Endpoint:**	Mean Length	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:29	**Analysis:**	Parametric Bioequivalence-Two Sample	**Status Level:**	1
Edit Date:	15 Jul-21 8:27	**MD5 Hash:**	C7D5C6EE30E9F66959022C2ACF37C8B	**Editor ID:**	000-189-126-0

Graphics





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

Batch ID:	04-3432-8680	**Test Type:**	Growth-Germination	**Analyst:**		
Start Date:	11 Jun-21 13:01	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater	
Ending Date:	13 Jun-21 13:01	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable	
Test Length:	48h	**Taxon:**	Ochrophyta	**Source:**	Ventura Dive	**Age:**

Sample ID:	11-1840-3887	**Code:**	DCO0621.099klp	**Project:**	Platform Edith Whole Effluent Toxicity
Sample Date:	10 Jun-21 04:00	**Material:**	Sample Water	**Source:**	Bioassay Report
Receipt Date:	10 Jun-21 16:30	**CAS (PC):**		**Station:**	Produced Water (Platform Edith)
Sample Age:	33h (10.5 °C)	**Client:**	DCOR, LLC.		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	6.5	2.688	10.31	6.2	6.8	0.2121	0.4243	6.53%	0
0.01825		2	6.7	4.159	9.241	6.5	6.9	0.1414	0.2828	4.22%	0
Overall		4	6.6	6.097	7.103	6.2	6.9	0.1581	0.3162	4.79%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
0.01825		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
Overall		4	7.9	7.9	7.9	7.9	7.9	0	0	0.00%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	34	34	34	34	34	0	0	0.00%	0
0.01825		2	34	34	34	34	34	0	0	0.00%	0
Overall		4	34	34	34	34	34	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
0.01825		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
Overall		4	14.85	14.76	14.94	14.8	14.9	0.02887	0.05773	0.39%	0 (0%)

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

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		6.8					
0.01825				6.9					
0	N	2		6.2					
0.01825				6.5					

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
0.01825				7.9					
0	N	2		7.9					
0.01825				7.9					

Salinity-ppt

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		34					
0.01825				34					
0	N	2		34					
0.01825				34					

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		14.8					
0.01825				14.8					
0	N	2		14.9					
0.01825				14.9					

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: Dean Nesna

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

Remarks
8 Grab samples every 3 hrs. in 24 hours period

Use EPA Method 600/R95/136

Grab Sample NO.	Date Sampled	Time Sampled	Comp	Grab	Sample Description	Water	Soil	Sludge	Other	Container #	Container Type	Analysis	Red Abalone	Giant Kelp	Topsmelt				Remarks
1	6/9/2021	7:00AM		X	Produced Water	X				1	P		X	X	X				Produced Water Temp: 13.9°C
2	6/9/2021	10:AM		X	Produced Water	X													
3	6/9/2021	01:00PM		X	Produced Water	X						Temp. deg. C =					10.5°C		
4	6/9/2021	04:00PM		X	Produced Water	X													
5	6/9/2021	07:00PM		X	Produced Water	X													
6	6/9/2021	10:00PM		X	Produced Water	X						Chlorine (mg/L) =					<0.1		
7	6/10/2021	01:00AM		X	Produced Water	X													
8	6/10/2021	04:00AM		X	Produced Water	X						NH3 (mg/L) =					>10		

CHECK ONE BOX
Dispose Samples X
Return Samples

Relinquished by :(Signature)	Date	Received by :(Signature)	Relinquished by :(Signature)	Date	Received by :(Signature)
	6-10-62			6/10/21	6/10/21
Print Name: Eddie Oskorne	Time 0700	Print Name: JAY RAO	Print Name: JAY RAO	Time 4:30	Print Name: A. Ramos 1630
Relinquished by :(Signature)	Date	Received by :(Signature)	Relinquished by :(Signature)	Date	Received by :(Signature)
Print Name:	Time	Print Name:	Print Name:	Time	Print Name:
Relinquished by :(Signature)	Date	Received by :(Signature)			
Print Name:	Time	Print Name:			

Turn Around time

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

Verified By Lead Operator(Signature)
Print Name

Date 6-9-21
Time 1400

aquatic bioassay & consulting laboratories, inc

CHRONIC ABALONE DEVELOPMENT BIOASSAY

DATE: 11 June 2021

STANDARD TOXICANT: Zinc

NOEC = 32.00 ug/l

EC25 = 38.78 ug/l
EC50 = 45.56 ug/l

Yours very truly,

Scott Johnson
Laboratory Director

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

CETIS Summary Report

Report Date:	14 Jul-21 08:02 (p 1 of 1)
Test Code/ID:	ABS061121 / 02-0199-0557

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

Batch ID:	02-2228-9760	**Test Type:**	Development	**Analyst:**			
Start Date:	11 Jun-21 12:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Reconstituted Water		
Ending Date:	13 Jun-21 13:00	**Species:**	Haliotis rufescens	**Brine:**	Not Applicable		
Test Length:	48h	**Taxon:**	Gastropod	**Source:**	Cultured Abalone	**Age:**	

Sample ID:	20-6440-0381	**Code:**	ABS061121	**Project:**	REF TOX
Sample Date:	11 Jun-21 12:30	**Material:**	Zinc	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	---	**Client:**	Internal Lab		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
11-6138-0064	Proportion Normal	Steel Many-One Rank Sum Test		32	56	42.33	13.1%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	µg/L	95% LCL	95% UCL	S
07-5016-1096	Proportion Normal	Linear Interpolation (ICPIN)		EC10	34.71	33.78	35.38	1
				EC15	36.07	35.07	37.06	
				EC20	37.42	36.28	38.75	
				EC25	38.78	37.58	40.44	
				EC40	42.85	41.13	45.5	
				EC50	45.56	43.42	49.04	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
07-5016-1096	Proportion Normal	Control Resp	0.914	0.8	>>	Yes	Passes Criteria
11-6138-0064	Proportion Normal	Control Resp	0.914	0.8	>>	Yes	Passes Criteria
11-6138-0064	Proportion Normal	NOEL	32	<<	56	No	Passes Criteria
11-6138-0064	Proportion Normal	PMSD	0.1308	<<	0.2	No	Passes Criteria

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	0.9140	0.8696	0.9584	0.8700	0.9400	0.0160	0.0358	3.91%	0.00%
18		5	0.9260	0.8902	0.9618	0.8800	0.9500	0.0129	0.0288	3.11%	-1.31%
32		5	0.9260	0.8961	0.9559	0.9000	0.9500	0.0108	0.0241	2.60%	-1.31%
56		5	0.1060	-0.0519	0.2639	0.0000	0.2800	0.0569	0.1272	120.00%	88.40%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
180		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Proportion Normal Detail

MD5: 6F507A966594E62806513D0BA4563AB5

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.9400	0.8800	0.9400	0.9400	0.8700
18		0.9500	0.9300	0.8800	0.9200	0.9500
32		0.9500	0.9000	0.9400	0.9400	0.9000
56		0.2800	0.0500	0.0000	0.2000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000
180		0.0000	0.0000	0.0000	0.0000	0.0000

Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	94/100	88/100	94/100	94/100	87/100
18		95/100	93/100	88/100	92/100	95/100
32		95/100	90/100	94/100	94/100	90/100
56		28/100	5/100	0/100	20/100	0/100
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

Report Date:	14 Jul-21 08:02 (p 1 of 2)
Test Code/ID:	ABS061121 / 02-0199-0557

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

Analysis ID:	11-6138-0064	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.7
Analyzed:	14 Jul-21 8:02	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	14 Jul-21 7:59	**MD5 Hash:**	6F507A966594E62806513D0BA4563AB5	**Editor ID:**	000-189-126-0

Batch ID:	02-2228-9760	**Test Type:**	Development	**Analyst:**			
Start Date:	11 Jun-21 12:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Reconstituted Water		
Ending Date:	13 Jun-21 13:00	**Species:**	Haliotis rufescens	**Brine:**	Not Applicable		
Test Length:	48h	**Taxon:**	Gastropod	**Source:**	Cultured Abalone	**Age:**	

Sample ID:	20-6440-0381	**Code:**	ABS061121	**Project:**	REF TOX
Sample Date:	11 Jun-21 12:30	**Material:**	Zinc	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	---	**Client:**	Internal Lab		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	32	56	42.33	---	0.1195	13.08%

Steel Many-One Rank Sum Test

Control vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	18	30.5	17	1	8	CDF	0.9186	Non-Significant Effect
	32	31	17	1	8	CDF	0.9353	Non-Significant Effect
	56*	15	17	0	8	CDF	0.0123	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	Upper	Overlap	Decision
Control Resp	0.914	0.8	>>	Yes	Passes Criteria
NOEL	32	<<	56	No	Passes Criteria
PMSD	0.1308	<<	0.2	No	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.91993	1.30664	3	82.25	<1.0E-05	Significant Effect
Error	0.254187	0.0158867	16			
Total	4.17411		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	14.24	11.34	0.0026	Unequal Variances
	Levene Equality of Variance Test	11.83	5.292	0.0002	Unequal Variances
	Mod Levene Equality of Variance Test	10.98	5.953	0.0009	Unequal Variances
Distribution	Anderson-Darling A2 Test	0.9357	3.878	0.0178	Normal Distribution
	D'Agostino Kurtosis Test	1.587	2.576	0.1126	Normal Distribution
	D'Agostino Skewness Test	0.7193	2.576	0.4719	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	3.035	9.21	0.2193	Normal Distribution
	Kolmogorov-Smirnov D Test	0.2414	0.2235	0.0034	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.9082	0.866	0.0589	Normal Distribution

Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	0.9140	0.8696	0.9584	0.9400	0.8700	0.9400	0.0160	3.91%	0.00%
18		5	0.9260	0.8902	0.9618	0.9300	0.8800	0.9500	0.0129	3.11%	-1.31%
32		5	0.9260	0.8961	0.9559	0.9400	0.9000	0.9500	0.0108	2.60%	-1.31%
56		5	0.1060	0.0000	0.2639	0.0500	0.0000	0.2800	0.0569	120.00%	88.40%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
180		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

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

Analysis ID:	11-6138-0064	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.7
Analyzed:	14 Jul-21 8:02	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	14 Jul-21 7:59	**MD5 Hash:**	6F507A966594E62806513D0BA4563AB5	**Editor ID:**	000-189-126-0

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.2780	1.2000	1.3550	1.3230	1.2020	1.3230	0.0280	4.90%	0.00%
18		5	1.2990	1.2330	1.3650	1.3030	1.2170	1.3450	0.0237	4.08%	-1.65%
32		5	1.2980	1.2410	1.3550	1.3230	1.2490	1.3450	0.0204	3.51%	-1.58%
56		5	0.2694	-0.0212	0.5599	0.2255	0.0500	0.5576	0.1046	86.86%	78.92%
100		5	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0000	0.00%	96.09%
180		5	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0000	0.00%	96.09%

Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.9400	0.8800	0.9400	0.9400	0.8700
18		0.9500	0.9300	0.8800	0.9200	0.9500
32		0.9500	0.9000	0.9400	0.9400	0.9000
56		0.2800	0.0500	0.0000	0.2000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000
180		0.0000	0.0000	0.0000	0.0000	0.0000

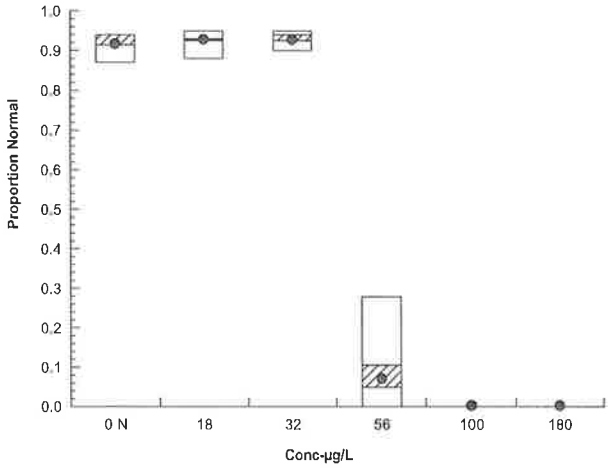
Angular (Corrected) Transformed Detail

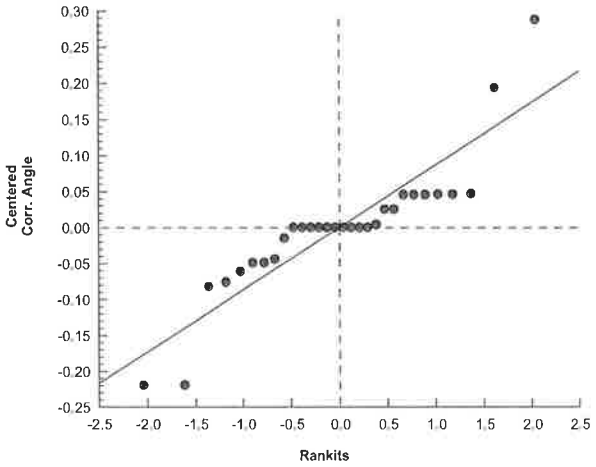
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.3230	1.2170	1.3230	1.3230	1.2020
18		1.3450	1.3030	1.2170	1.2840	1.3450
32		1.3450	1.2490	1.3230	1.3230	1.2490
56		0.5576	0.2255	0.0500	0.4636	0.0500
100		0.0500	0.0500	0.0500	0.0500	0.0500
180		0.0500	0.0500	0.0500	0.0500	0.0500

Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	94/100	88/100	94/100	94/100	87/100
18		95/100	93/100	88/100	92/100	95/100
32		95/100	90/100	94/100	94/100	90/100
56		28/100	5/100	0/100	20/100	0/100
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

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

Analysis ID:	07-5016-1096	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.7
Analyzed:	14 Jul-21 8:02	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	14 Jul-21 7:59	**MD5 Hash:**	6F507A966594E62806513D0BA4563AB5	**Editor ID:**	000-189-126-0

Batch ID:	02-2228-9760	**Test Type:**	Development	**Analyst:**		
Start Date:	11 Jun-21 12:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Reconstituted Water	
Ending Date:	13 Jun-21 13:00	**Species:**	Haliotis rufescens	**Brine:**	Not Applicable	
Test Length:	48h	**Taxon:**	Gastropod	**Source:**	Cultured Abalone	**Age:**

Sample ID:	20-6440-0381	**Code:**	ABS061121	**Project:**	REF TOX
Sample Date:	11 Jun-21 12:30	**Material:**	Zinc	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	---	**Client:**	Internal Lab		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.914	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	µg/L	95% LCL	95% UCL
EC10	34.71	33.78	35.38
EC15	36.07	35.07	37.06
EC20	37.42	36.28	38.75
EC25	38.78	37.58	40.44
EC40	42.85	41.13	45.5
EC50	45.56	43.42	49.04

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	**Code**	**Count**	**Mean**	**Median**	**Min**	**Max**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	N	5	0.9140	0.9400	0.8700	0.9400	3.91%	0.00%	457/500	0.9220	0.00%
18		5	0.9260	0.9300	0.8800	0.9500	3.11%	-1.31%	463/500	0.9220	0.00%
32		5	0.9260	0.9400	0.9000	0.9500	2.60%	-1.31%	463/500	0.9220	0.00%
56		5	0.1060	0.0500	0.0000	0.2800	120.00%	88.40%	53/500	0.1060	88.50%
100		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/500	0.0000	100.00%
180		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/500	0.0000	100.00%

Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.9400	0.8800	0.9400	0.9400	0.8700
18		0.9500	0.9300	0.8800	0.9200	0.9500
32		0.9500	0.9000	0.9400	0.9400	0.9000
56		0.2800	0.0500	0.0000	0.2000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000
180		0.0000	0.0000	0.0000	0.0000	0.0000

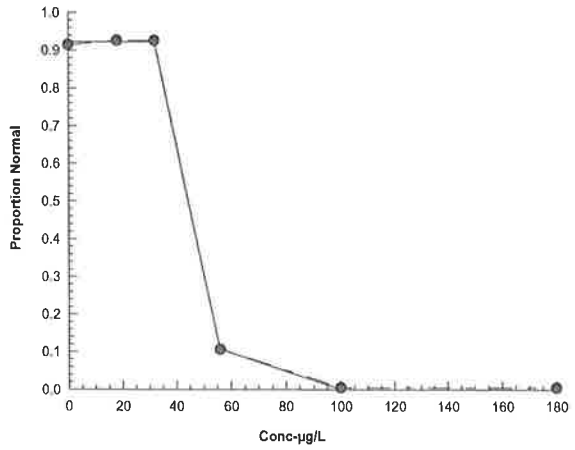
Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	94/100	88/100	94/100	94/100	87/100
18		95/100	93/100	88/100	92/100	95/100
32		95/100	90/100	94/100	94/100	90/100
56		28/100	5/100	0/100	20/100	0/100
100		0/100	0/100	0/100	0/100	0/100
180		0/100	0/100	0/100	0/100	0/100

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

Analysis ID:	07-5016-1096	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.7
Analyzed:	14 Jul-21 8:02	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	14 Jul-21 7:59	**MD5 Hash:**	6F507A966594E62806513D0BA4563AB5	**Editor ID:**	000-189-126-0

Graphics



CETIS Measurement Report

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

Batch ID:	02-2228-9760	**Test Type:**	Development	**Analyst:**		
Start Date:	11 Jun-21 12:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Reconstituted Water	
Ending Date:	13 Jun-21 13:00	**Species:**	Haliotis rufescens	**Brine:**	Not Applicable	
Test Length:	48h	**Taxon:**	Gastropod	**Source:**	Cultured Abalone	**Age:**

Sample ID:	20-6440-0381	**Code:**	ABS061121	**Project:**	REF TOX
Sample Date:	11 Jun-21 12:30	**Material:**	Zinc	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	---	**Client:**	Internal Lab		

Parameter Acceptability Criteria

Parameter	Min	Max	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
Salinity	34	34	32	36	Yes	Passes Criteria
Temperature	15.2	15.2	14	16	Yes	Passes Criteria

Dissolved Oxygen-mg/L

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	8.65	6.744	10.56	8.5	8.8	0.1061	0.2121	2.45%	0
18		2	8.6	7.329	9.871	8.5	8.7	0.07071	0.1414	1.64%	0
32		2	8.6	7.329	9.871	8.5	8.7	0.07071	0.1414	1.64%	0
56		2	8.6	7.329	9.871	8.5	8.7	0.07071	0.1414	1.64%	0
100		2	8.6	7.329	9.871	8.5	8.7	0.07071	0.1414	1.64%	0
180		2	8.6	7.329	9.871	8.5	8.7	0.07071	0.1414	1.64%	0
Overall		12	8.608	8.534	8.682	8.5	8.8	0.03362	0.1164	1.35%	0 (0%)

pH-Units

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.75	7.115	8.385	7.7	7.8	0.03536	0.07072	0.91%	0
18		2	7.8	6.529	9.071	7.7	7.9	0.07071	0.1414	1.81%	0
32		2	7.8	6.529	9.071	7.7	7.9	0.07071	0.1414	1.81%	0
56		2	7.8	6.529	9.071	7.7	7.9	0.07071	0.1414	1.81%	0
100		2	7.8	6.529	9.071	7.7	7.9	0.07071	0.1414	1.81%	0
180		2	7.8	6.529	9.071	7.7	7.9	0.07071	0.1414	1.81%	0
Overall		12	7.792	7.728	7.855	7.7	7.9	0.02876	0.09962	1.28%	0 (0%)

Salinity-ppt

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	34	34	34	34	34	0	0	0.00%	0
18		2	34	34	34	34	34	0	0	0.00%	0
32		2	34	34	34	34	34	0	0	0.00%	0
56		2	34	34	34	34	34	0	0	0.00%	0
100		2	34	34	34	34	34	0	0	0.00%	0
180		2	34	34	34	34	34	0	0	0.00%	0
Overall		12	34	34	34	34	34	0	0	0.00%	0 (0%)

Temperature-°C

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	15.2	15.19	15.21	15.2	15.2	0	0	0.00%	0
18		2	15.2	15.19	15.21	15.2	15.2	0	0	0.00%	0
32		2	15.2	15.19	15.21	15.2	15.2	0	0	0.00%	0
56		2	15.2	15.19	15.21	15.2	15.2	0	0	0.00%	0
100		2	15.2	15.19	15.21	15.2	15.2	0	0	0.00%	0
180		2	15.2	15.19	15.21	15.2	15.2	0	0	0.00%	0
Overall		12	15.2	15.2	15.2	15.2	15.2	0	0	0.00%	0 (0%)

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

Dissolved Oxygen-mg/L

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		8.8					
18				8.7					
32				8.7					
56				8.7					
100				8.7					
180				8.7					
0	N	2		8.5					
18				8.5					
32				8.5					
56				8.5					
100				8.5					
180				8.5					

pH-Units

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.8					
18				7.9					
32				7.9					
56				7.9					
100				7.9					
180				7.9					
0	N	2		7.7					
18				7.7					
32				7.7					
56				7.7					
100				7.7					
180				7.7					

Salinity-ppt

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		34					
18				34					
32				34					
56				34					
100				34					
180				34					
0	N	2		34					
18				34					
32				34					
56				34					
100				34					
180				34					

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

Temperature-°C

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		15.2					
18				15.2					
32				15.2					
56				15.2					
100				15.2					
180				15.2					
0	N	2		15.2					
18				15.2					
32				15.2					
56				15.2					
100				15.2					
180				15.2					

aquatic bioassay & consulting laboratories, inc

CHRONIC KELP GERMINATION & GROWTH BIOASSAY

DATE: 11 June - 2021

STANDARD TOXICANT: Copper Chloride

ENDPOINT: GERMINATION

NOEC = 32.00 ug/l

EC25 = 97.89 ug/l
EC50 = 133.90 ug/l

ENDPOINT: GROWTH-LENGTH

NOEC = 32.00 ug/l

IC25 = 103.70 ug/l
IC50 = 172.70 ug/l

Yours very truly,

Scott Johnson
Laboratory Director

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

CETIS Summary Report

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

Batch ID:	09-3113-4368	**Test Type:**	Growth-Germination	**Analyst:**			
Start Date:	11 Jun-21 13:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater		
Ending Date:	13 Jun-21 13:00	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable		
Test Length:	48h	**Taxon:**	Ochrophyta	**Source:**	David Gutoff	**Age:**	

Sample ID:	15-2453-5258	**Code:**	KLP061121	**Project:**	
Sample Date:	11 Jun-21 13:00	**Material:**	Copper chloride	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	---	**Client:**	Internal Lab		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
06-6212-4628	Germination Rate	Steel Many-One Rank Sum Test	✓	32	100	56.57	7.44%	1
16-2778-3676	Mean Length	Dunnett Multiple Comparison Test	✓	32	100	56.57	1.53%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	µg/L	95% LCL	95% UCL	S
03-6157-3186	Germination Rate	Linear Interpolation (ICPIN)	✓	EC10	57.49	49.86	60.93	1
			✓	EC15	70.95	63.6	75.21	
			✓	EC20	84.42	76.37	89.98	
			✓	EC25	97.89	89.15	102.9	
			✓	EC40	119.9	116.2	122.7	
			✓	EC50	133.9	130.3	136.8	
06-1155-7333	Mean Length	Linear Interpolation (ICPIN)		IC10	59.29	56.79	61.68	1
				IC15	74.18	71.54	76.76	
				IC20	89.07	86.2	92.05	
				IC25	103.7	100.5	106.5	
				IC40	145.1	142.2	148.1	
				IC50	172.7	168.1	177.1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
03-6157-3186	Germination Rate	Control Resp	0.926	0.7	>>	Yes	Passes Criteria
06-6212-4628	Germination Rate	Control Resp	0.926	0.7	>>	Yes	Passes Criteria
06-1155-7333	Mean Length	Control Resp	13.18	10	>>	Yes	Passes Criteria
16-2778-3676	Mean Length	Control Resp	13.18	10	>>	Yes	Passes Criteria
16-2778-3676	Mean Length	NOEL	32	<<	35	No	Passes Criteria
06-6212-4628	Germination Rate	PMSD	0.07445	<<	0.2	No	Passes Criteria
16-2778-3676	Mean Length	PMSD	0.01525	<<	0.2	No	Passes Criteria

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

Germination Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	0.9260	0.8974	0.9546	0.9000	0.9600	0.0103	0.0230	2.49%	0.00%
5.6		5	0.9240	0.8928	0.9552	0.9000	0.9600	0.0112	0.0251	2.72%	0.22%
10		5	0.9240	0.9014	0.9466	0.9000	0.9400	0.0081	0.0182	1.97%	0.22%
18		5	0.9340	0.9114	0.9566	0.9100	0.9600	0.0081	0.0182	1.94%	-0.86%
32		5	0.9220	0.9016	0.9424	0.9000	0.9400	0.0073	0.0164	1.78%	0.43%
100		5	0.6880	0.6641	0.7119	0.6600	0.7100	0.0086	0.0192	2.80%	25.70%
180		5	0.1580	0.1235	0.1925	0.1300	0.1900	0.0124	0.0278	17.56%	82.94%
320		5	0.0400	-0.0711	0.1511	0.0000	0.2000	0.0400	0.0894	223.61%	95.68%

Mean Length Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	13.18	13.08	13.28	13.1	13.3	0.03742	0.08367	0.63%	0.00%
5.6		5	13.02	12.86	13.18	12.8	13.1	0.05831	0.1304	1.00%	1.21%
10		5	13.08	12.98	13.18	13	13.2	0.03742	0.08367	0.64%	0.76%
18		5	13.02	12.86	13.18	12.9	13.2	0.05831	0.1304	1.00%	1.21%
32		5	13.16	12.99	13.33	13.1	13.4	0.06	0.1342	1.02%	0.15%
100		5	10.06	9.893	10.23	9.9	10.2	0.06	0.1342	1.33%	23.67%
180		5	6.24	5.998	6.482	6	6.5	0.08718	0.1949	3.12%	52.66%
320		5	0	0	0	0	0	0	0	---	100.00%

Germination Rate Detail

MD5: B1766EBD67BB08250A46025F426FD053

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.9000	0.9300	0.9100	0.9600	0.9300
5.6		0.9100	0.9100	0.9000	0.9600	0.9400
10		0.9100	0.9400	0.9300	0.9400	0.9000
18		0.9600	0.9100	0.9400	0.9300	0.9300
32		0.9300	0.9000	0.9300	0.9400	0.9100
100		0.6800	0.7100	0.6600	0.6900	0.7000
180		0.1600	0.1800	0.1300	0.1300	0.1900
320		0.2000	0.0000	0.0000	0.0000	0.0000

Mean Length Detail

MD5: 86F1A2E2C55373867028E15CB0376307

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	13.1	13.1	13.3	13.2	13.2
5.6		13.1	13.1	13	12.8	13.1
10		13.1	13	13.1	13	13.2
18		12.9	13.1	13.2	13	12.9
32		13.1	13.1	13.1	13.4	13.1
100		9.9	10.2	10	10	10.2
180		6.5	6.1	6.3	6.3	6
320		0	0	0	0	0

Germination Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	90/100	93/100	91/100	96/100	93/100
5.6		91/100	91/100	90/100	96/100	94/100
10		91/100	94/100	93/100	94/100	90/100
18		96/100	91/100	94/100	93/100	93/100
32		93/100	90/100	93/100	94/100	91/100
100		68/100	71/100	66/100	69/100	70/100
180		16/100	18/100	13/100	13/100	19/100
320		20/100	0/100	0/100	0/100	0/100

CETIS Analytical Report

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

Analysis ID:	06-6212-4628	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:35	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	15 Jul-21 8:31	**MD5 Hash:**	B1766EBD67BB08250A46025F426FD053	**Editor ID:**	000-189-126-0

Batch ID:	09-3113-4368	**Test Type:**	Growth-Germination	**Analyst:**			
Start Date:	11 Jun-21 13:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater		
Ending Date:	13 Jun-21 13:00	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable		
Test Length:	48h	**Taxon:**	Ochrophyta	**Source:**	David Gutoff	**Age:**	

Sample ID:	15-2453-5258	**Code:**	KLP061121	**Project:**	
Sample Date:	11 Jun-21 13:00	**Material:**	Copper chloride	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	---	**Client:**	Internal Lab		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	32	100	56.57	---	0.06894	7.44%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		5.6	27	16	3	8	CDF	0.8468	Non-Significant Effect
		10	28	16	3	8	CDF	0.8994	Non-Significant Effect
		18	31	16	3	8	CDF	0.9798	Non-Significant Effect
		32	27	16	3	8	CDF	0.8468	Non-Significant Effect
		100*	15	16	0	8	CDF	0.0251	Significant Effect
		180*	15	16	0	8	CDF	0.0251	Significant Effect
		320*	15	16	0	8	CDF	0.0251	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
Control Resp	0.926	0.7	>>	Yes	Passes Criteria
PMSD	0.07445	<<	0.2	No	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.73243	1.10463	7	199.6	<1.0E-05	Significant Effect
Error	0.177093	0.0055342	32			
Total	7.90952		39			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	31.16	18.48	5.8E-05	Unequal Variances
	Levene Equality of Variance Test	3.792	3.258	0.0042	Unequal Variances
	Mod Levene Equality of Variance Test	0.4568	3.496	0.8557	Equal Variances
Distribution	Anderson-Darling A2 Test	2.128	3.878	<1.0E-05	Non-Normal Distribution
	D'Agostino Kurtosis Test	4.759	2.576	<1.0E-05	Non-Normal Distribution
	D'Agostino Skewness Test	5.369	2.576	<1.0E-05	Non-Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	51.48	9.21	<1.0E-05	Non-Normal Distribution
	Kolmogorov-Smirnov D Test	0.1797	0.1617	0.0023	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.7318	0.9236	<1.0E-05	Non-Normal Distribution

Germination Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	0.9260	0.8974	0.9546	0.9300	0.9000	0.9600	0.0103	2.49%	0.00%
5.6		5	0.9240	0.8928	0.9552	0.9100	0.9000	0.9600	0.0112	2.72%	0.22%
10		5	0.9240	0.9014	0.9466	0.9300	0.9000	0.9400	0.0081	1.97%	0.22%
18		5	0.9340	0.9114	0.9566	0.9300	0.9100	0.9600	0.0081	1.94%	-0.86%
32		5	0.9220	0.9016	0.9424	0.9300	0.9000	0.9400	0.0073	1.78%	0.43%
100		5	0.6880	0.6641	0.7119	0.6900	0.6600	0.7100	0.0086	2.80%	25.70%
180		5	0.1580	0.1235	0.1925	0.1600	0.1300	0.1900	0.0124	17.56%	82.94%
320		5	0.0400	0.0000	0.1511	0.0000	0.0000	0.2000	0.0400	223.61%	95.68%

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

Analysis ID:	06-6212-4628	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:35	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	15 Jul-21 8:31	**MD5 Hash:**	B1766EBD67BB08250A46025F426FD053	**Editor ID:**	000-189-126-0

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.2980	1.2410	1.3560	1.3030	1.2490	1.3690	0.0207	3.57%	0.00%
5.6		5	1.2950	1.2320	1.3570	1.2660	1.2490	1.3690	0.0225	3.89%	0.26%
10		5	1.2930	1.2510	1.3350	1.3030	1.2490	1.3230	0.0152	2.62%	0.40%
18		5	1.3130	1.2660	1.3600	1.3030	1.2660	1.3690	0.0169	2.87%	-1.14%
32		5	1.2890	1.2510	1.3270	1.3030	1.2490	1.3230	0.0136	2.36%	0.71%
100		5	0.9783	0.9526	1.0040	0.9803	0.9483	1.0020	0.0093	2.12%	24.64%
180		5	0.4077	0.3603	0.4551	0.4115	0.3689	0.4510	0.0171	9.37%	68.59%
320		5	0.1327	-0.0969	0.3624	0.0500	0.0500	0.4636	0.0827	139.35%	89.77%

Germination Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.9000	0.9300	0.9100	0.9600	0.9300
5.6		0.9100	0.9100	0.9000	0.9600	0.9400
10		0.9100	0.9400	0.9300	0.9400	0.9000
18		0.9600	0.9100	0.9400	0.9300	0.9300
32		0.9300	0.9000	0.9300	0.9400	0.9100
100		0.6800	0.7100	0.6600	0.6900	0.7000
180		0.1600	0.1800	0.1300	0.1300	0.1900
320		0.2000	0.0000	0.0000	0.0000	0.0000

Angular (Corrected) Transformed Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.2490	1.3030	1.2660	1.3690	1.3030
5.6		1.2660	1.2660	1.2490	1.3690	1.3230
10		1.2660	1.3230	1.3030	1.3230	1.2490
18		1.3690	1.2660	1.3230	1.3030	1.3030
32		1.3030	1.2490	1.3030	1.3230	1.2660
100		0.9695	1.0020	0.9483	0.9803	0.9912
180		0.4115	0.4381	0.3689	0.3689	0.4510
320		0.4636	0.0500	0.0500	0.0500	0.0500

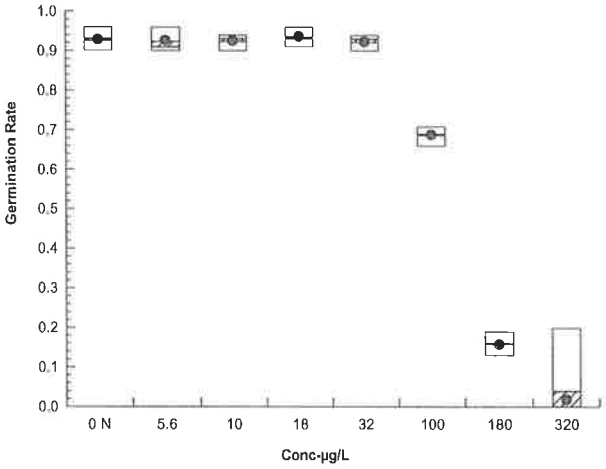
Germination Rate Binomials

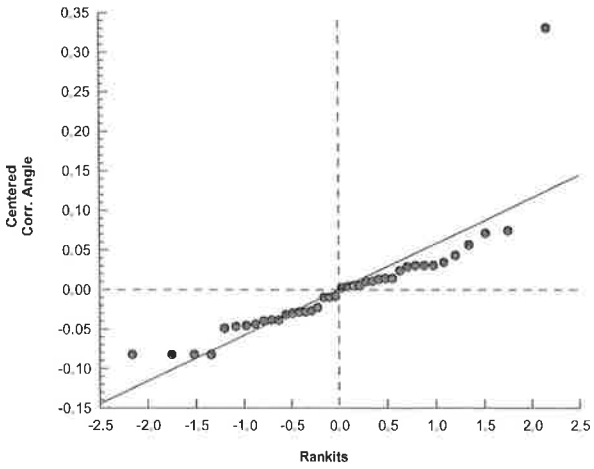
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	90/100	93/100	91/100	96/100	93/100
5.6		91/100	91/100	90/100	96/100	94/100
10		91/100	94/100	93/100	94/100	90/100
18		96/100	91/100	94/100	93/100	93/100
32		93/100	90/100	93/100	94/100	91/100
100		68/100	71/100	66/100	69/100	70/100
180		16/100	18/100	13/100	13/100	19/100
320		20/100	0/100	0/100	0/100	0/100

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

Analysis ID:	06-6212-4628	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:35	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	15 Jul-21 8:31	**MD5 Hash:**	B1766EBD67BB08250A46025F426FD053	**Editor ID:**	000-189-126-0

Graphics





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

Analysis ID:	16-2778-3676	**Endpoint:**	Mean Length	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:35	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	15 Jul-21 8:31	**MD5 Hash:**	86F1A2E2C55373867028E15CB0376307	**Editor ID:**	000-189-126-0

Batch ID:	09-3113-4368	**Test Type:**	Growth-Germination	**Analyst:**			
Start Date:	11 Jun-21 13:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater		
Ending Date:	13 Jun-21 13:00	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable		
Test Length:	48h	**Taxon:**	Ochrophyta	**Source:**	David Gutoff	**Age:**	

Sample ID:	15-2453-5258	**Code:**	KLP061121	**Project:**	
Sample Date:	11 Jun-21 13:00	**Material:**	Copper chloride	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	---	**Client:**	Internal Lab		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	32	100	56.57	---	0.201	1.53%

Dunnett Multiple Comparison Test

Control vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	5.6	1.916	2.407	0.201	8	CDF	0.1271	Non-Significant Effect
	10	1.198	2.407	0.201	8	CDF	0.3641	Non-Significant Effect
	18	1.916	2.407	0.201	8	CDF	0.1271	Non-Significant Effect
	32	0.2395	2.407	0.201	8	CDF	0.7823	Non-Significant Effect
	100*	37.37	2.407	0.201	8	CDF	<1.0E-05	Significant Effect
	180*	83.12	2.407	0.201	8	CDF	<1.0E-05	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	Upper	Overlap	Decision
Control Resp	13.18	10	>>	Yes	Passes Criteria
NOEL	32	<<	35	No	Passes Criteria
PMSD	0.01525	<<	0.2	No	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	211.048	35.1747	6	2018	<1.0E-05	Significant Effect
Error	0.488	0.0174286	28			
Total	211.536		34			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	3.762	16.81	0.7088	Equal Variances
	Levene Equality of Variance Test	1.041	3.528	0.4204	Equal Variances
	Mod Levene Equality of Variance Test	0.5222	3.812	0.7850	Equal Variances
Distribution	Anderson-Darling A2 Test	0.3903	3.878	0.3864	Normal Distribution
	D'Agostino Kurtosis Test	0.1904	2.576	0.8490	Normal Distribution
	D'Agostino Skewness Test	0.5075	2.576	0.6118	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	0.2938	9.21	0.8634	Normal Distribution
	Kolmogorov-Smirnov D Test	0.1489	0.1723	0.0478	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9778	0.9146	0.6852	Normal Distribution

Mean Length Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	13.18	13.08	13.28	13.2	13.1	13.3	0.03741	0.63%	0.00%
5.6		5	13.02	12.86	13.18	13.1	12.8	13.1	0.05832	1.00%	1.21%
10		5	13.08	12.98	13.18	13.1	13	13.2	0.03742	0.64%	0.76%
18		5	13.02	12.86	13.18	13	12.9	13.2	0.05831	1.00%	1.21%
32		5	13.16	12.99	13.33	13.1	13.1	13.4	0.06001	1.02%	0.15%
100		5	10.06	9.893	10.23	10	9.9	10.2	0.06	1.33%	23.67%
180		5	6.24	5.998	6.482	6.3	6	6.5	0.08718	3.12%	52.66%
320		5	0	0	0	0	0	0	0	---	100.00%

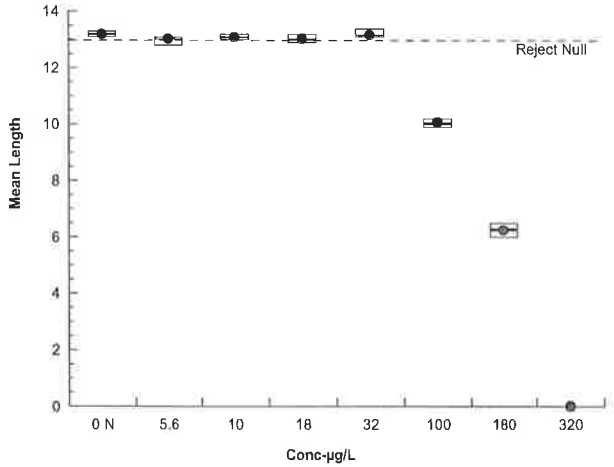
Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

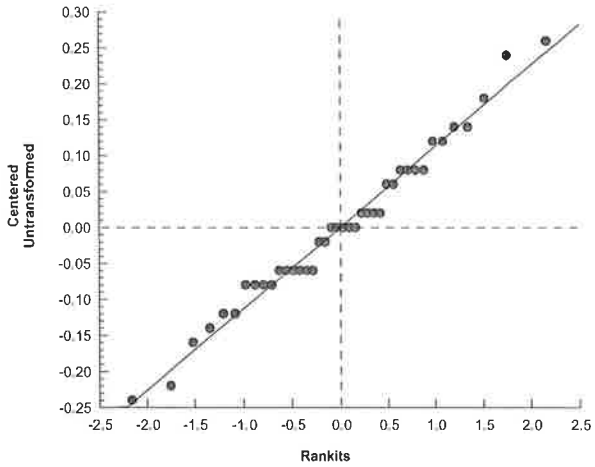
Analysis ID:	16-2778-3676	**Endpoint:**	Mean Length	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:35	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	15 Jul-21 8:31	**MD5 Hash:**	86F1A2E2C55373867028E15CB0376307	**Editor ID:**	000-189-126-0

Mean Length Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	13.1	13.1	13.3	13.2	13.2
5.6		13.1	13.1	13	12.8	13.1
10		13.1	13	13.1	13	13.2
18		12.9	13.1	13.2	13	12.9
32		13.1	13.1	13.1	13.4	13.1
100		9.9	10.2	10	10	10.2
180		6.5	6.1	6.3	6.3	6
320		0	0	0	0	0

Graphics





CETIS Analytical Report

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

Analysis ID:	03-6157-3186	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:35	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	15 Jul-21 8:31	**MD5 Hash:**	B1766EBD67BB08250A46025F426FD053	**Editor ID:**	000-189-126-0

Batch ID:	09-3113-4368	**Test Type:**	Growth-Germination	**Analyst:**			
Start Date:	11 Jun-21 13:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater		
Ending Date:	13 Jun-21 13:00	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable		
Test Length:	48h	**Taxon:**	Ochrophyta	**Source:**	David Gutoff	**Age:**	

Sample ID:	15-2453-5258	**Code:**	KLP061121	**Project:**	
Sample Date:	11 Jun-21 13:00	**Material:**	Copper chloride	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	---	**Client:**	Internal Lab		

Linear Interpolation Options

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

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
Control Resp	0.926	0.7	>>	Yes	Passes Criteria

Point Estimates

Level	µg/L	95% LCL	95% UCL
EC10	57.49	49.86	60.93
EC15	70.95	63.6	75.21
EC20	84.42	76.37	89.98
EC25	97.89	89.15	102.9
EC40	119.9	116.2	122.7
EC50	133.9	130.3	136.8

Germination Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	5	0.9260	0.9300	0.9000	0.9600	2.49%	0.00%	463/500	0.9270	0.00%
5.6		5	0.9240	0.9100	0.9000	0.9600	2.72%	0.22%	462/500	0.9270	0.00%
10		5	0.9240	0.9300	0.9000	0.9400	1.97%	0.22%	462/500	0.9270	0.00%
18		5	0.9340	0.9300	0.9100	0.9600	1.94%	-0.86%	467/500	0.9270	0.00%
32		5	0.9220	0.9300	0.9000	0.9400	1.78%	0.43%	461/500	0.9220	0.54%
100		5	0.6880	0.6900	0.6600	0.7100	2.80%	25.70%	344/500	0.6880	25.78%
180		5	0.1580	0.1600	0.1300	0.1900	17.56%	82.94%	79/500	0.1580	82.96%
320		5	0.0400	0.0000	0.0000	0.2000	223.61%	95.68%	20/500	0.0400	95.69%

Germination Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.9000	0.9300	0.9100	0.9600	0.9300
5.6		0.9100	0.9100	0.9000	0.9600	0.9400
10		0.9100	0.9400	0.9300	0.9400	0.9000
18		0.9600	0.9100	0.9400	0.9300	0.9300
32		0.9300	0.9000	0.9300	0.9400	0.9100
100		0.6800	0.7100	0.6600	0.6900	0.7000
180		0.1600	0.1800	0.1300	0.1300	0.1900
320		0.2000	0.0000	0.0000	0.0000	0.0000

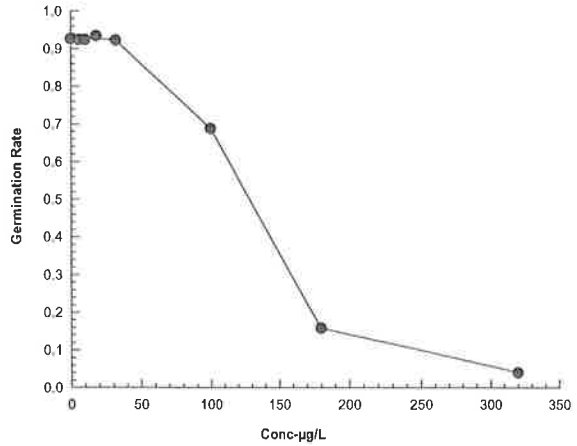
Macrocystis Germination and Germ Tube Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	03-6157-3186	**Endpoint:**	Germination Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:35	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	15 Jul-21 8:31	**MD5 Hash:**	B1766EBD67BB08250A46025F426FD053	**Editor ID:**	000-189-126-0

Germination Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	90/100	93/100	91/100	96/100	93/100
5.6		91/100	91/100	90/100	96/100	94/100
10		91/100	94/100	93/100	94/100	90/100
18		96/100	91/100	94/100	93/100	93/100
32		93/100	90/100	93/100	94/100	91/100
100		68/100	71/100	66/100	69/100	70/100
180		16/100	18/100	13/100	13/100	19/100
320		20/100	0/100	0/100	0/100	0/100

Graphics



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

Analysis ID:	06-1155-7333	**Endpoint:**	Mean Length	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:35	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	15 Jul-21 8:31	**MD5 Hash:**	86F1A2E2C55373867028E15CB0376307	**Editor ID:**	000-189-126-0

Batch ID:	09-3113-4368	**Test Type:**	Growth-Germination	**Analyst:**		
Start Date:	11 Jun-21 13:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater	
Ending Date:	13 Jun-21 13:00	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable	
Test Length:	48h	**Taxon:**	Ochrophyta	**Source:**	David Gutoff	**Age:**

Sample ID:	15-2453-5258	**Code:**	KLP061121	**Project:**	
Sample Date:	11 Jun-21 13:00	**Material:**	Copper chloride	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	---	**Client:**	Internal Lab		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1039755	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	13.18	10	>>	Yes	Passes Criteria

Point Estimates

Level	µg/L	95% LCL	95% UCL
IC10	59.29	56.79	61.68
IC15	74.18	71.54	76.76
IC20	89.07	86.2	92.05
IC25	103.7	100.5	106.5
IC40	145.1	142.2	148.1
IC50	172.7	168.1	177.1

Mean Length Summary

			Calculated Variate						Isotonic Variate	
Conc-µg/L	**Code**	**Count**	**Mean**	**Median**	**Min**	**Max**	**CV%**	**%Effect**	**Mean**	**%Effect**
0	N	5	13.18	13.2	13.1	13.3	0.63%	0.00%	13.18	0.00%
5.6		5	13.02	13.1	12.8	13.1	1.00%	1.21%	13.07	0.83%
10		5	13.08	13.1	13	13.2	0.64%	0.76%	13.07	0.83%
18		5	13.02	13	12.9	13.2	1.00%	1.21%	13.07	0.83%
32		5	13.16	13.1	13.1	13.4	1.02%	0.15%	13.07	0.83%
100		5	10.06	10	9.9	10.2	1.33%	23.67%	10.06	23.67%
180		5	6.24	6.3	6	6.5	3.12%	52.66%	6.24	52.66%
320		5	0	0	0	0	---	100.00%	0	100.00%

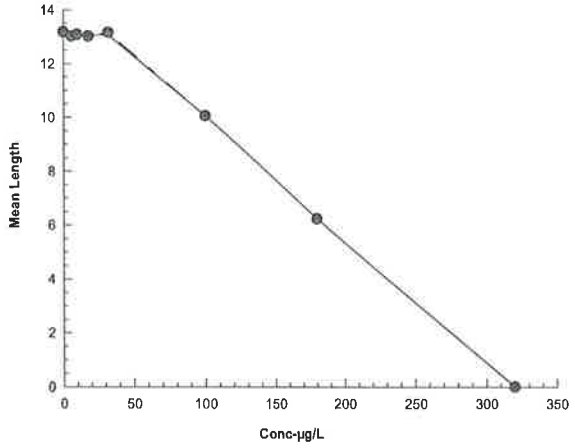
Mean Length Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	13.1	13.1	13.3	13.2	13.2
5.6		13.1	13.1	13	12.8	13.1
10		13.1	13	13.1	13	13.2
18		12.9	13.1	13.2	13	12.9
32		13.1	13.1	13.1	13.4	13.1
100		9.9	10.2	10	10	10.2
180		6.5	6.1	6.3	6.3	6
320		0	0	0	0	0

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

Analysis ID:	06-1155-7333	**Endpoint:**	Mean Length	**CETIS Version:**	CETISv1.9.7
Analyzed:	15 Jul-21 8:35	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	15 Jul-21 8:31	**MD5 Hash:**	86F1A2E2C55373867028E15CB0376307	**Editor ID:**	000-189-126-0

Graphics



CETIS Measurement Report

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

Batch ID:	09-3113-4368	**Test Type:**	Growth-Germination	**Analyst:**		
Start Date:	11 Jun-21 13:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater	
Ending Date:	13 Jun-21 13:00	**Species:**	Macrocystis pyrifera	**Brine:**	Not Applicable	
Test Length:	48h	**Taxon:**	Ochrophyta	**Source:**	David Gutoff	**Age:**

Sample ID:	15-2453-5258	**Code:**	KLP061121	**Project:**	
Sample Date:	11 Jun-21 13:00	**Material:**	Copper chloride	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	---	**Client:**	Internal Lab		

Dissolved Oxygen-mg/L

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	6.5	2.688	10.31	6.2	6.8	0.2121	0.4243	6.53%	0
5.6		2	6.85	6.215	7.485	6.8	6.9	0.03535	0.0707	1.03%	0
10		2	6.55	2.103	11	6.2	6.9	0.2475	0.495	7.56%	0
18		2	6.45	5.815	7.085	6.4	6.5	0.03536	0.07072	1.10%	0
32		2	6.45	2.003	10.9	6.1	6.8	0.2475	0.495	7.67%	0
100		2	6.25	1.803	10.7	5.9	6.6	0.2475	0.495	7.92%	0
180		2	6.3	1.218	11.38	5.9	6.7	0.2828	0.5657	8.98%	0
320		2	6.25	0.5322	11.97	5.8	6.7	0.3182	0.6364	10.18%	0
Overall		16	6.45	6.246	6.654	5.8	6.9	0.09574	0.383	5.94%	0 (0%)

pH-Units

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
5.6		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
10		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
18		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
32		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
100		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
180		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
320		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
Overall		16	7.9	7.9	7.9	7.9	7.9	0	0	0.00%	0 (0%)

Salinity-ppt

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	34	34	34	34	34	0	0	0.00%	0
5.6		2	34	34	34	34	34	0	0	0.00%	0
10		2	34	34	34	34	34	0	0	0.00%	0
18		2	34	34	34	34	34	0	0	0.00%	0
32		2	34	34	34	34	34	0	0	0.00%	0
100		2	34	34	34	34	34	0	0	0.00%	0
180		2	34	34	34	34	34	0	0	0.00%	0
320		2	34	34	34	34	34	0	0	0.00%	0
Overall		16	34	34	34	34	34	0	0	0.00%	0 (0%)

Temperature-°C

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
5.6		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
10		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
18		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
32		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
180		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
320		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
Overall		16	14.85	14.82	14.88	14.8	14.9	0.01291	0.05164	0.35%	0 (0%)

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

Dissolved Oxygen-mg/L

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		6.8					
5.6				6.9					
10				6.9					
18				6.5					
32				6.8					
100				6.6					
180				6.7					
320				6.7					
0	N	2		6.2					
5.6				6.8					
10				6.2					
18				6.4					
32				6.1					
100				5.9					
180				5.9					
320				5.8					

pH-Units

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
5.6				7.9					
10				7.9					
18				7.9					
32				7.9					
100				7.9					
180				7.9					
320				7.9					
0	N	2		7.9					
5.6				7.9					
10				7.9					
18				7.9					
32				7.9					
100				7.9					
180				7.9					
320				7.9					

Salinity-ppt

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		34					
5.6				34					
10				34					
18				34					
32				34					
100				34					
180				34					
320				34					
0	N	2		34					
5.6				34					
10				34					
18				34					
32				34					
100				34					
180				34					
320				34					

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

Temperature-°C

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		14.8					
5.6				14.8					
10				14.8					
18				14.8					
32				14.8					
100				14.8					
180				14.8					
320				14.8					
0	N	2		14.9					
5.6				14.9					
10				14.9					
18				14.9					
32				14.9					
100				14.9					
180				14.9					
320				14.9					