



Acute Toxicity Test Results

Sample TTII CRYSTAL BRIGHT,
collected May 18, 2022

Final Report - revised

June 20, 2022

Submitted to: **Target Technologies**
Burnaby, BC

SAMPLE INFORMATION

Sample ID	Dates		Rainbow trout test initiation	Receipt temperature
	Collected	Received		
TTII CRYSTAL BRIGHT	18-May-22 at 1435h	18-May-22 at 1517h	10-Jun-22 at 1345h	21.6°C

TESTS

- Rainbow trout 96-h LC50 test using under-gravel filters

RESULTS

Toxicity test results

Test Concentration (g/L)	Survival (%)
Control	100
12.5	100
25	100
50	100
100	100
200	100

Sample ID	LC50 (g/L)
TTII CRYSTAL BRIGHT	> 200 *

LC = Lethal Concentration, * Highest concentration comprised of 2.4 kg of the product in 12 L of dilution water which is equivalent to 200 g/L.

The rainbow trout toxicity test exhibited 100% survival in the 200 g/L sample concentration (highest concentration tested) after 96-h exposure period.


Fish survival (100%) in all the sample concentrations tested exceeded any definitive calculations of a median lethal concentration (LC50) value for this sample and, therefore, the LC50 could only be estimated as greater than the highest concentration tested (LC50 >200 g/L).

QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	2.0 (1.7 – 2.3) g/L KCl ¹
Reference toxicant historical mean (2 SD range)	1.6 (0.9 – 2.9) g/L KCl
Reference toxicant CV	31%
Organism health history	Acceptable
Protocol deviations	Yes (See below)
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

¹ Test Date: June 10, 2022, LC = Lethal Concentration, CL = Confidence Limits, SD = Standard Deviation, CV = Coefficient of Variation

The test treatments were set up using under gravel filters with corresponding sample amounts added over the top of the filters. For example, 2400 g of the sample was added to prepare the highest test concentration, which corresponded to 200 g/L sample concentration (see Table 1).



Report By:
Ditty Kakkassery, R.P. Bio.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P. Bio.
Senior Analyst

This revised report was issued after the client requested to update the sample name from TTII CRYSTAL BRIGHT (W/ COAST) as given on the chain of custody form to TTII CRYSTAL BRIGHT. No other changes were made.

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) LC50 test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	12 L
Test solution depth	≥15 cm
Test concentrations	Five concentrations 200 g/l, 100 g/l, 50 g/l, 25 g/l and 12.5 g/l plus laboratory control.
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (1990), EPS 1/RM/9, with 1996 & 2007 amendments
Statistical software	CETIS Version 2.1.1
Test endpoints	Survival (96-hour LC50)
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Potassium Chloride (KCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Target Technologies

Start Date/Time: June 10, 2022; 1345h

Work Order No.: 220978

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: T11 Crystal Bright (w/coast)

Sample Date: May 18, 2022

Date Received: May 18, 2022

Sample Volume: 3 x 5 lbs

Other: Testing was carried out using undergravel filters.

Test Validity Criteria:
≥ 90% Control Survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water

Hardness (mg/L CaCO₃): 21

Alkalinity (mg/L CaCO₃): 22

Test Organism Information:

Batch No.: 052522a

Source: Lyndon Fish Hatcheries

No. Fish/Volume (L): 10/12L

Loading Density (g/L): 0.22

Mean Length ± SD (mm): 31 ± 1

Mean Weight ± SD (g): 0.26 ± 0.02

Range: 29 - 33

Range: 0.24 - 0.29

KCI Reference Toxicant Results:

Reference Toxicant ID: RBTK32

Stock Solution ID: Not Applicable

Date Initiated: June 10, 2022

96-h LC50 (95% CL) [g/L KCl]: 2.0 (1.7 - 2.3) g/L KCl

Reference Toxicant Mean and Historical Range [g/L KCl]: 1.6 (0.9 - 2.9) g/L KCl

Reference Toxicant CV (%): 31%

Test Results: The 96h LC50 is estimated to be >200 g/L (w/v).^{*} Highest conc. tested.

Reviewed by: 

Date reviewed: June 17, 2022

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Target Technologies
 Sample I.D.: TH Crystal Bright (w/ coast)
 W.O. #: 220978
 RBT Batch #: 052522a
 Date Collected/Time: May 18/22 @ 1435 h
 Date Setup/Time: Jun 10/22 @ 1348 h
 CER #: 10
 Sample Setup By: PH

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0.72
 Total Pre-aeration Time (mins): -
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C			
D.O. (mg/L)			
pH			
Cond. (µS/cm)			
Salinity (ppt)			

Thermometer: CER #10
 D.O. meter/probe: D02 12
 Cond./Salinity meter/probe: C-2 12
 pH meter/probe: pH 2/2

Concentration g/L	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
0				10	10	10	10	16.0	15.5	14.5	15.0	14.5	9.9	9.8	9.8	9.7	10.1	6.9	7.1	7.2	7.2	7.4	51	57
12.5				10	10	10	10	16.0	15.5	14.5	15.0	14.5	9.9	9.8	9.7	9.7	9.8	6.9	7.1	7.2	7.2	7.3	56	61
25				10	10	10	10	15.5	15.5	14.5	15.0	14.5	9.9	9.8	9.5	9.4	9.6	6.9	7.1	7.2	7.3	7.3	60	69
50				10	10	10	10	15.5	15.5	14.5	15.0	14.5	9.9	9.7	9.8	9.7	10.1	6.9	7.2	7.3	7.4	7.4	68	82
100				10	10	10	10	15.5	15.5	14.5	15.0	14.5	9.9	9.7	9.8	9.8	9.9	7.0	7.1	7.4	7.3	7.4	83	109
200				10	10	10	10	15.5	15.5	14.5	15.0	14.5	9.9	8.8	8.6	8.9	8.6	7.0	7.3	7.5	7.2	7.3	96	177
													9.9											
Initials				JMC	BAM	PH	HEC	PH	JMC	BAM	PH	HEC	PH	JMC	BAM	PH	HEC	PH	JMC	BAM	PH	HEC	PH	HEC

Sample Description/Comments: Dark green crystals, no odors.

Fish Description at 96 h: All fish appear normal. Number of Stressed Fish at 96 h: 0

Other Observations: Testing done using undergravel filters. 2.4 kg of sample was weighed for the top concentration and did a half series weight for the lower concentrations

Reviewed by: [Signature] Date Reviewed: June 17, 2022

APPENDIX C – Chain-of-custody form



TESTING LOCATION (Please Circle)

Burnaby
 8664 Commerce Court
 Burnaby, British Columbia, Canada
 V5A 4N7
 Phone 604.420.8773

Calgary
 #4, 6125 12 Street SE
 Calgary, Alberta, Canada
 T2H 2K1
 Phone 403.253.7121

Chain of Custody

5/18/22
 Date _____ Page 1 of 1

Report to: Company: <u>TARGET TECHNOLOGIES</u> Address: <u>8535 EASTLAKE DR.</u> City/Prov/PC: <u>BURNABY BC</u> Contact: <u>JOHN KIRAUD</u> Phone: <u>604.644.2232</u> Email: <u>nadia.minato@ttionline.com</u>		Invoice To: Company: <u>same</u> Address: _____ City/Prov/PC: _____ Contact: _____ Phone: _____ Email: _____ PO No.: _____		ANALYSES REQUIRED									
---	--	--	--	--------------------------	--	--	--	--	--	--	--	--	--

Sample Collection By: N. MINATO Sample Type: Grab OR Composite

SAMPLE ID	DATE (DD/MM/YY)	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS	Receipt Temperature (°C)
1 TTII CRYSTAL	18/5/22	2:35pm		3 x 5 LBS EACH		21.6
2 BRIGHT						
3 (W/COAST)						
4						
5						
6						
7						
8						
9						
10						

SPECIAL INSTRUCTIONS/COMMENTS (CLIENT) <u>LC SO TESTING</u>	SAMPLE RECEIPT DETAILS (LABORATORY)				SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)
	1. Total No. of Containers	<u>3</u>	4. Ice Present in Cooler?	<u>Y/N</u>	
	2. Courier		5. Seal Present?	<u>Y/N</u>	
	3. Good Condition?	<u>Y/N</u>	6. Initials Present on Seal?	<u>Y/N</u>	

RELINQUISHED BY (CLIENT) <u>NADIA MINATO</u> <small>(Printed Name)</small> <u>N. Minato</u> <small>(Signature)</small> <u>TARGET TECHNOLOGIES</u> <small>(Company)</small> <u>18/5/22</u> <small>(Date DD/MM/YY and Time)</small>		RECEIVED BY (LABORATORY) <u>TH</u> <small>(Signature)</small> <u>May 18/22 @ 15:17</u> <small>(Date DD/MM/YY and Time)</small>		Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling, or transport of the sample, application or interpretation of the test data or results in part or in whole.
--	--	---	--	--

END OF REPORT
