

**Nodularin Report**

*Project: Central Davis Sewer District*

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 Sample Receipt Date: 19 October 2023  
 Sample Condition: 20.0 °C upon receipt  
 Report #: 231017\_CDS  
 Date Prepared: 26 October 2023  
 Prepared by: Laura Kostrzewski

Table 1: Samples analyzed

<u>Sample Identification</u>	<u>Description/Site</u>	<u>Collection Date</u>
FB1	Great Salt Lake	17 October 2023
FB4	Great Salt Lake	17 October 2023

**Analytes:** Nodularin-R (NOD)

<b>Abbreviations</b>			
MRL	Method Reporting Limit	FS	Field Sample
MDL	Method Detection Limit	LFSM	Lab Fortified Sample Matrix
Blank	Water/buffer free from interferences	LFSMD	Lab Fortified Sample Matrix Duplicate
LFB	Lab Fortified Blank	LD	Lab Duplicate
MB	Method Blank	IS	Internal Standard
CCC	Continued Calibration Check	—	Not Analyzed
ND	Not Detected above the MDL/MRL	NA	Not Applicable

## Sample Preparation

### *Water Sample Freeze Thaw*

The samples were inverted for 60 seconds to mix and 40 mL aliquots were removed for phycochemical analyses. Three freeze/thaw cycles were conducted on 30 mL aliquots to lyse cells and release of toxins.

### *Extraction*

#### *NOD*

Sample aliquots were fortified with internal standard (IS) with a duplicate LFSM. Preconditioned Strata X Polymeric SPE (200 mg) columns were loaded with sample, rinsed with deionized water and eluted with 90% acetonitrile. Elutions were blown to dryness (N<sub>2</sub> at 60°C) and reconstituted in 50% methanol (20-fold preconcentration). All samples were filtered (0.2 µm PVDF) prior to LC-MS/MS.

## Analytical Techniques

### *Liquid chromatography mass spectrometry/mass spectrometry (LC-MS/MS)*

#### *NOD*

LC-MS/MS was used for a targeted nodularin-R analysis. The [M+H]<sup>+</sup> ion for NOD (*m/z* 825.5) was fragmented and the product ions (*m/z* 389.4, 674.5, 691.5, 753.5, 781.5, 808.0) were monitored. The [M+H]<sup>+</sup> ion for the internal standard [<sup>15</sup>N<sub>10</sub>]MC-LR (*m/z* 1005.5) was fragmented and the product ion (*m/z* 987.5) was monitored. The internal standard method was used in quantification.

**Quality Control**

Table 2: Lab fortified matrix sample (LFSM) and internal standard (IS) returns prepared for analyses pre-extraction. Additional QA/QC checks included LFBs, continued calibration checks and external curves.

Analyte	Concentration (ng/mL)	Sample ID(s)	QC Type	Return
NOD	0.5	FB1	LFSM	113%
[ <sup>15</sup> N <sub>10</sub> ]MC-LR	0.5	all aliquots	IS	88 ± 13%

\*Control limits: water LFSM ± 30%; complicated matrix LFSM and when LFSM within 2x MDL ±50%; IS ± 50%


Qualifier	Flag
CL	Analytical result is estimated due to ineffective quenching.
J	Analyte was positively identified; the associated numerical value is estimated.
PT	The reported result is estimated because the sample was not analyzed within required holding time.
B	Analytical result is estimated. Analyte was detected in associated reagent blank as well as the samples.
E	Analytical result is estimated. Values achieved were outside calibration range.
N	Spiked sample control was outside limits
T	The reported result is estimated because the sample exceeded temperature threshold when received

**Summary of Results**

Table 3: Summary results for LC-MS/MS analysis of nodularin-R (NOD), reported in ppb (ng/mL).

<b>Sample ID</b>	<b>NOD</b>
FB1	ND <sup>T</sup>
FB4	ND <sup>T</sup>
<i>MDL (ng/mL):</i>	<i>0.10</i>
<i>Analyst Initials:</i>	<i>AF</i>
<i>Date Analyzed:</i>	<i>10/27/2023</i>

**Interpretations:** Nodularin-R (NOD) was not detected in the submitted samples above the method reporting limit (0.1 ng/mL – ppb).

Submitted by:   
Mark T. Aubel, Ph.D.  
Date: October 28, 2023

*The results in this report relate only to the samples listed above.  
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