Microcystin, Cylindrospermopsin, Saxitoxin & Anatoxin-a Report

Project: Utah DEQ – Division of Water Quality

Sample ID	Site	Date Collected
4917310	Utah Lake 0.5 mile W Gerova #15-A	7/20/16
4917520	Utah Lake 2 mile E of Saratoga	7/20/16
4917370	Utah Lake 1 mile E of Pelican	7/20/16
4917500	Utah Lake 3 mile WNW of Lincoln	7/20/16
4917770	Utah Lake Outside Entrance	7/20/16
4917390	Utah Lake Proud Harbor	7/20/16
NA	Utah Lake Dark Green Line	7/20/16
NA	Utah Lake State Park Dock	7/20/16

Toxins – microcystins/nodularins (MCs), cylindrospermopsin (CYN), saxitoxin (STX), anatoxin-a (ANTX-A)

Sample Prep

Samples were ultrasonicated to lyse cells and release toxins. Samples were filtered prior to ANTX-A analysis, with a duplicate lab fortified matrix (LFM) prepared at 0.1 µg/L. LFMs for CYN (1 µg/L) and STX (0.2 µg/L) and MC-LR (1.0 µg/L) were also prepared.

Analytical Methodology

MC

The Adda (Abraxis) microcystins enzyme linked immunosorbent assay (ELISA) was utilized for the quantitative and sensitive congener-independent detection of MCs. The current assay is sensitive to down to a LOD/LOQ of 0.15 µg/L for total MCs. The average recoveries of laboratory fortified blanks (LFB) spiked with 1.0 µg/L MCLR was 105% and 112%.

CYN

A cylindrospermopsin ELISA (Abraxis) was utilized for the quantitative detection of CYN. The current assay is sensitive down to a LOD/LOQ limit of 0.10 µg/L for CYN. The average LFB recovery was 95%.

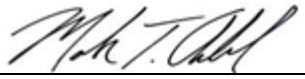
STX
A saxitoxin enzyme linked immunosorbent assay (ELISA) was utilized for the quantitative detection of STX. The current assay is sensitive down to a LOD/LOQ limit of 0.05 µg/L STX. The average LFB recovery was 100%.

ANTX-A
Liquid chromatography-mass spectrometry/ mass spectrometry (LC-MS/MS) was utilized for the determination of ANTX-A. The $[M+H]^+$ ion for ANTX-A (*m/z* 166) was fragmented and the product ions (*m/z* 56, 91, 107, 131 & 149) were monitored.

Summary of Results

Sample	MC levels (µg/L)	CYN levels (µg/L)	STX levels (µg/L)	ANTX-A levels (µg/L)
4917310	**ND**	**ND**	**ND**	**ND**
4917520	**ND**	**ND**	**ND**	**ND**
4917370	**ND**	**ND**	**ND**	**ND**
4917500	**ND**	**ND**	**ND**	**ND**
4917770	**ND**	**ND**	**ND**	**ND**
4917390	**ND**	**ND**	**ND**	**ND**
4917310	**ND**	**ND**	**ND**	**ND**
Utah Lake Dark Green Line	**ND**	**ND**	**ND**	**ND**
Utah Lake State Park Dock	**ND**	**ND**	**ND**	**ND**
Detection Limits (µg/L)	*0.15*	*0.10*	*0.05*	*0.05*

ND = Not detected above the detection limit

Submitted by: 
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Date: 7/26/16