#### Harmful Algal Blooms

Hamzah D Ansari

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Survey

References

### Harmful Algal Blooms

Hamzah D. Ansari

Oakland University

October 31, 2018

### Outline

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References

1 Introduction

2 Survey

## Harmful Algal Blooms

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Reference:

- Increase in primary productivity and
- growth of microspopic algae and cyanobacteria
- Toxin-producing genera
- Decrease biodiversity
- Anoxic environment <sup>a</sup>



<sup>&</sup>lt;sup>a</sup>Test

### Occurance

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- Naturally occuring
- Exacerbate from anthropogenic causes

### Lake Erie 2014

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### Possible causes

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## Toxicity

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- Irritant
  - Lipolysacharides<sup>1</sup>
- Toxins
  - Microcystin and nodularin <sup>1</sup>
  - Cylindrospermopsin<sup>2</sup>
  - Anatoxin<sup>3</sup>
  - Saxitoxin <sup>1</sup>

<sup>&</sup>lt;sup>1</sup>Moore, Richard and Ohtani, Ikuko, "Cyanobacterial Toxins".

<sup>&</sup>lt;sup>2</sup>Dittmann, Fewer, and Neilan, "Cyanobacterial toxins".

# Microcystin

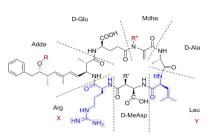
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- Cyclic peptide
- 1000 Da
- Hepatoxin and carcinogenic
- Inhibits protein phosphotase
- Diverse structures



# Cylindrospermopsin

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## Anatoxin

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### Saxitoxin

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### **Exposure Route**

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- Direct contact
- Aerosols
- Ingestion
  - Seafood/Fish
  - Drinking water
  - Algal supplements

## Law and Regulation

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- Safe Drinking Water Act
- Maximum Contaminant Level
  - Regulated and enforced
- Contaminant Candidate List
  - "More like guidelines"

## Objectives

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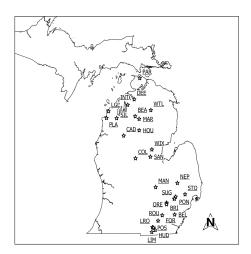
## Surveyed Lakes

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### Water Sampling

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- Sampled each lake once a month
- Collected water
- Quickly transported back
- Analyzed ASAP

### **SPATT**

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Reference:

- Solid phase adsorbtion toxin tracking
- Sachet filled with resin
- Left for one month

test

# Analysis

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### Coloremetric

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# LC-MS/MS

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- Freeze/Thaw
- Filter

### **SPATT**

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Reference:

- Solid phase adsorbtion toxin tracking
- Similiar to the stationary phase

### **ELISA**

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# Geospatial Analysis

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### Results

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## Could we predict HABs?

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## Acknowledgment

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- Michigan Department Environmental Quality
- Oakland University and the Chemistry Department

### References I

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