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### **Certified reference materials available from the NRCC Biotoxin Metrology program**

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# Certified Reference Materials Available from the NRCC Biotoxin Metrology Program

NRC-CNR

Measurement Science and Standards, Biotoxin Metrology



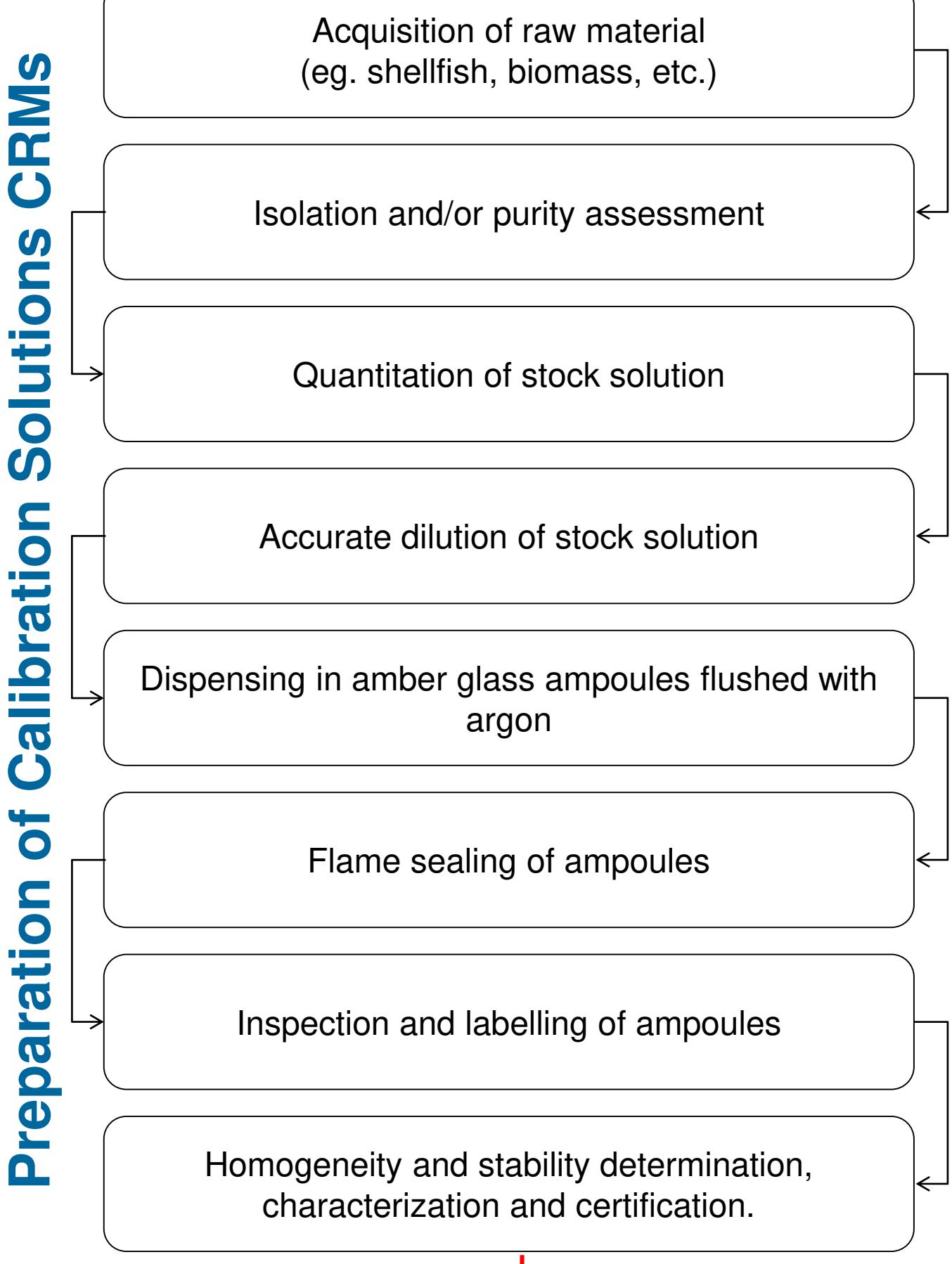
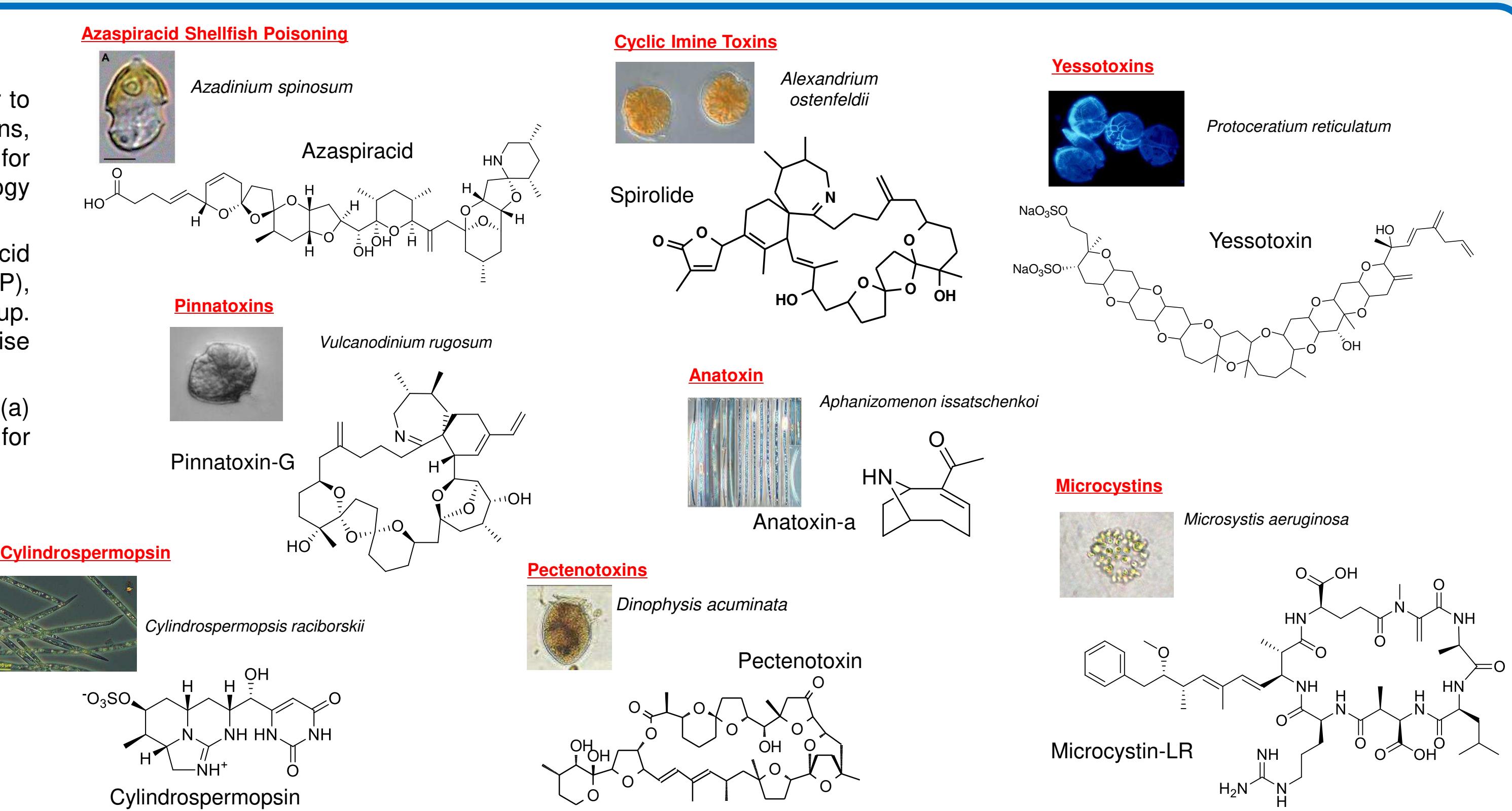
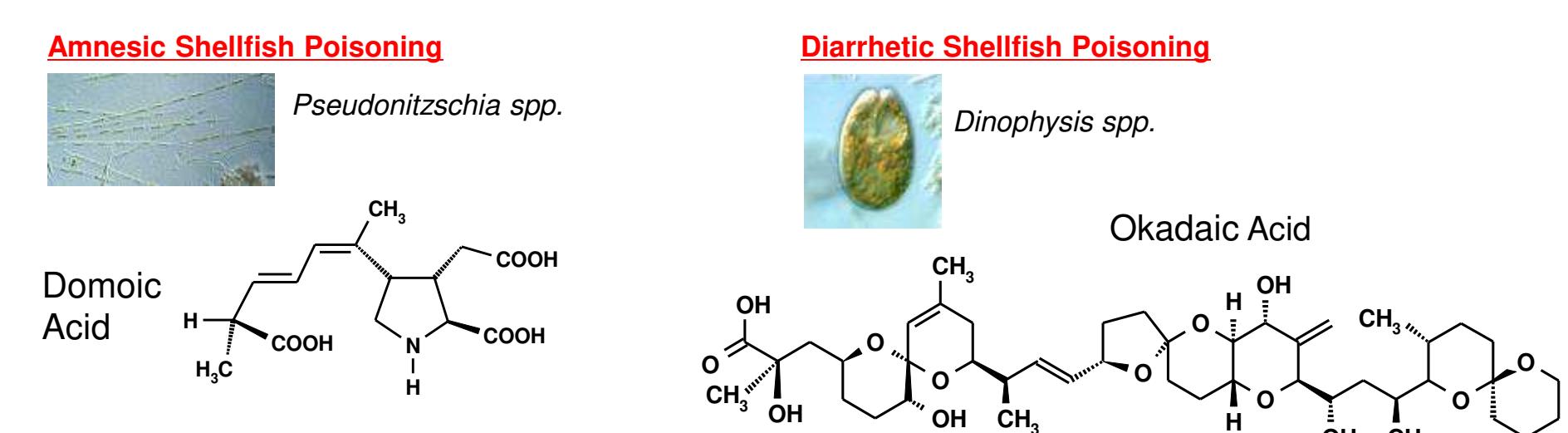
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## Introduction

Ingestion of shellfish contaminated with toxins can result in diarrhea, amnesia, paralysis and even death. Routine monitoring prior to harvest is essential to ensure that seafood is safe for consumption and is necessary for international trade. Other algal toxins, originating from freshwater cyanobacteria, pose risks for drinking water. Testing for all these toxins requires validated methods, for which accurate calibration standards and certified reference materials (CRMs) are essential elements. The NRCC Biotoxin Metrology Program is a long running program that produces CRMs for marine and freshwater toxins under a rigorous quality system.

Marine toxins can be divided into two general classifications: hydrophilic and lipophilic. The hydrophilic toxins include the domoic acid and saxitoxin groups, which are responsible for amnesic shellfish poisoning (ASP) and paralytic shellfish poisoning (PSP), respectively. The lipophilic toxins include the okadaic acid group, pectenotoxins, azaspiracids, yessotoxins, and the cyclic imine group. The okadaic acid group of toxins is responsible for diarrhetic shellfish poisoning (DSP). Fresh and brackish water toxins comprise compounds from the microcystin, cylindrospermopsin, anatoxin, and saxitoxin groups.

This poster will provide an update on the biotoxin CRMs available from Biotoxin Metrology. There are two categories of materials: (a) calibration solution CRMs and (b) matrix CRMs. The former are critical for instrument calibration, while the latter are important for verifying the complete analytical method, from sample preparation and extraction through to data analysis.



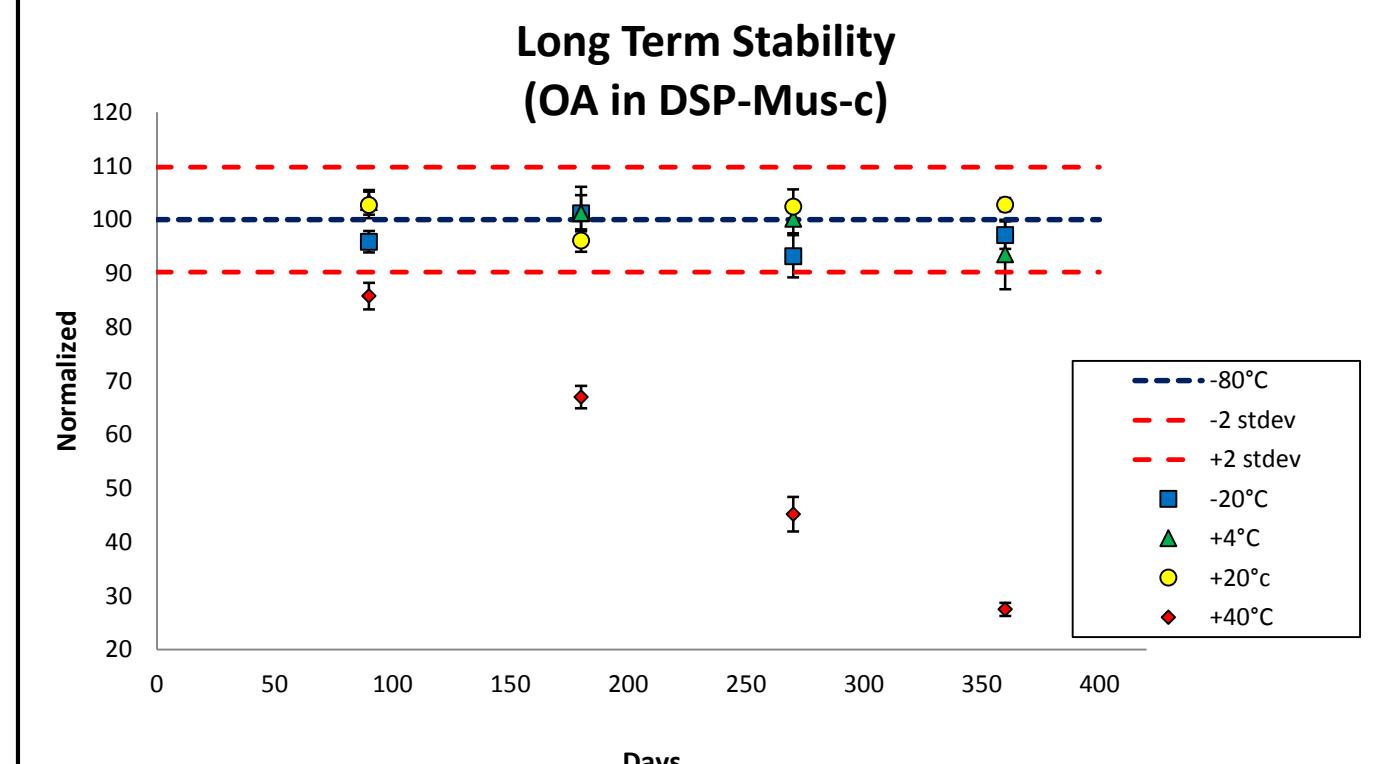
## Homogeneity and Stability

### Homogeneity (ISO guide 30)

"A condition of being of uniform structure or composition with respect to one or more specified properties....."

NRC CRM-FDMT-1 homogeneity data.

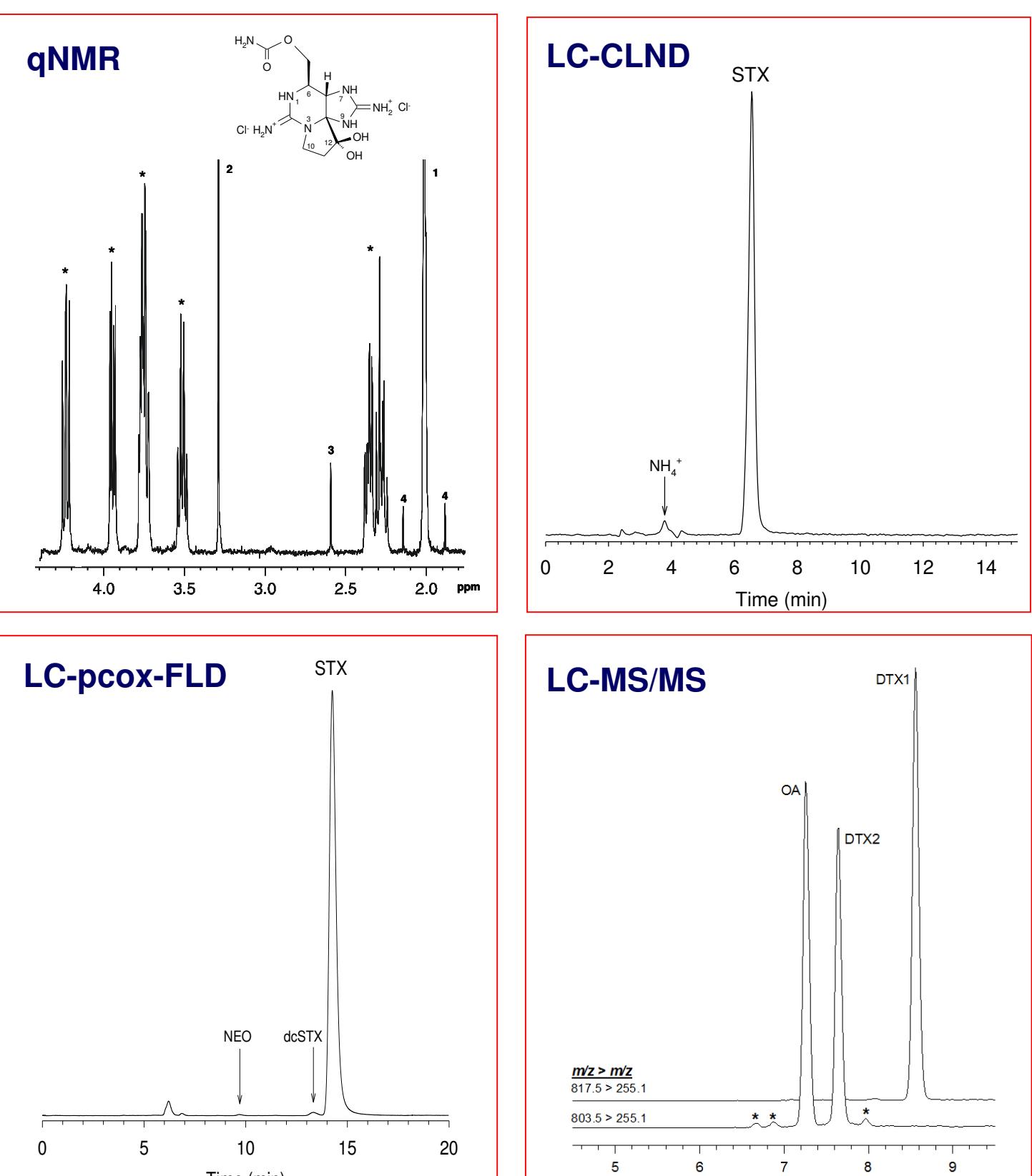
	OA	DTX1	DTX2	YTX	AZA1	AZA2	AZA3	PTX2	SPX	13-desMe-C
Average (mg/kg)	1.17	0.69	3.0	2.1	3.4	0.83	0.68	0.26	2.6	
SD (n=20)	0.03	0.02	0.1	0.1	0.1	0.02	0.01	0.01	0.1	
%RSD	2.8	2.9	2.3	4.7	1.6	1.8	1.7	5.6	3.6	
$\mu_{bb}$ (%)	1.5	1.1	0.8	1.2	1.3	1.1	2.6	3.0	3.8	



## Certification Methods

Values and uncertainties assigned following ISO guides

- qNMR
- LC-CLND
- LC-MS/MS
- LC-UVD
- LC-pcoxFD
- Accurate calibration



## NRC CRMs for Marine Biotoxins

Okadaic Acid/Dinophysistoxins (DSP toxins)	
NRC CRM-OA	okadaic acid
NRC CRM-DTX1	dinophysistoxin-1
NRC CRM-DTX2	dinophysistoxin-2
NRC CRM-DSP-Mus	mussel tissue with DSP toxins
Pectenotoxins	
NRC CRM-PTX2	pectenotoxin-2
Yessotoxins	
NRC CRM-YTX	yessotoxin
NRC CRM-hYTX	1-homo-yessotoxin
Cyclic Imine Toxins	
NRC CRM-GYM	gymnodimine
NRC CRM-SPX1	13-desmethyl spirolide C
NRC CRM-PnTX-G	pinnatoxin-G
Azaspiracids	
NRC CRM-AZA-1	azaspiracid-1
NRC CRM-AZA-2	azaspiracid-2
NRC CRM-AZA-3	azaspiracid-3
NRC CRM-AZA-Mus	mussel tissue with azaspiracids
Multi-toxin Freeze Dried Mussel Tissue	
NRC CRM-FDMT-1	

Paralytic Shellfish (PSP) Toxins	
NRC CRM-C1&2	N-sulfocarbamoyl-gonyautoxin-1&2
NRC CRM-C3&4	N-sulfocarbamoyl-gonyautoxin-3&4
NRC CRM-dcGTX1&4	decarbamoylgonyautoxin-1&4
NRC CRM-dcGTX2&3	decarbamoylgonyautoxin-2&3
NRC CRM-dcNEO	decarbamoyleneosaxitin
NRC CRM-dcSTX	decarbamoylsaxitin
NRC CRM-GTX1&4	decarbamoylgonyautoxin-1&4
NRC CRM-GTX2&3	decarbamoylgonyautoxin-2&3
NRC CRM-GTX5	gonyautoxin-5
NRC CRM-GTX6	gonyautoxin-6
NRC CRM-NEO	neosaxitin
NRC CRM-STX	saxitin
NRC CRM-PSP-Mus	mussel tissue with PSP toxins
Amnesic Shellfish (ASP) Toxins	
NRC CRM-DA	domoic acid
NRC CRM-iDAc	iso-domoic acid C
NRC CRM-ASP-Mus	mussel tissue with ASP toxins
Control Mussel Tissue	
NRC CRM-Zero-Mus	

CRMs in italics are temporarily unavailable or in progress

## NRC CRMs for Freshwater Biotoxins

Cylindrospermopsin	
NRC CRM-CYN	cylindrospermopsin
Microcystins	
NRC CRM-MCRR	microcystin-RR
NRC CRM-MCLR	microcystin-LR
NRC CRM-dmMCLR	[Dha7]-microcystin-LR
NRC CRM-NODR	nodularin-R
Anatoxins	
NRC CRM-ATX	anatoxin-a
NRC CRM-LWTX1	<i>Lyngbya wollei</i> saxitoxin analogue



Biotoxin Metrology's quality system is recognized by SIM (Sistema Interamericano de Metrología – Inter-American Metrology System), the Regional Metrology Organization for the Americas. SIM is committed to the implementation of a Global Measurement System within the Americas, in which all users can have confidence.

