



# Agri-Food & Biosciences Institute

## Annual Report Marine Biotoxin Analysis Official Control Monitoring Programme For Northern Ireland **1<sup>st</sup> January 2019 – 31<sup>st</sup> December 2019**

**Final Version**  
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*Quality statement: This report is a compilation of the information included on the reports provided weekly/monthly to the FSANI and showing the results of the toxin analyses undertaken on samples submitted by third parties. All results were quality checked and approved prior to release to the FSANI and the results compiled in this report have been further checked against a copy of the original reports held on a central database. Information relating to the origin of the samples (place, date and time of collection) is as provided by sampling staff and has not undergone verification checks by AFBI.*

**Method Standard Operating Procedures used during the course of the programme:**

Determination of Domoic Acid in Shellfish by High Performance Liquid Chromatography (CSD 406)

Determination of Paralytic Shellfish Poison by High Performance Liquid Chromatography (CSD 408)

Determination of Lipophilic Toxins in Shellfish Species by LC-MS/MS (CSD 379)

**Results of Programme****Table 1: Monitoring Samples Received 2019**

Sample Type	Number of samples
Oyster	134
Mussel	326
Total number of samples	460

**Table 2: Tests Carried Out 2019**

Test	Oyster	Mussel	Total
Domoic Acid	129	316	445
PSP	129	315	444
Lipophilic Toxins	134	325	459
Total number of tests			1348

**Table 3: Positive Northern Ireland Monitoring Samples 2019 (Levels above the regulatory limits)**

Test	Oyster	Mussel	Total
Domoic Acid	0	0	0
PSP	0	0	0
Lipophilic Toxins	0	4	4
Total number of positive tests			4

**Table 4: Turn Round Times 2019**

Test	Target	Percentage within Target
Domoic Acid	95% in 3 Days	100%
PSP	95% in 3 Days	100%
Lipophilic Toxins	95% in 3 Days	100%

**Table 5: Overview of the toxin results obtained for each bed monitored in 2019 within NI classified production areas**

Site location	Site Identification Reference (SIR)	No of samples received	Shellfish Species	Maximum toxin levels detected in 2019				
				DSP OA/DTX/PTX (µg/kg)	DSP AZA (µg/kg)	DSP YTX (mg/kg)	PSP (µg/kg)	ASP (µg/g)
Belfast Lough	B1-AFFNI 55	51	Mussel	65	NEG	NEG	NEG	<0.3
Belfast Lough	B3-AFFNI 50	51	Mussel	135	NEG	NEG	NEG	1.2
Belfast Lough	B12-AFFNI 54	51	Mussel	155	NEG	NEG	NEG	1.6
Belfast Lough	B20-AFFNI 53	51	Mussel	134	NEG	NEG	NEG	0.5
Carlingford Lough	C1-AFFNI 27	13	Mussel	NEG	NEG	NEG	NEG	<0.3
Carlingford Lough	C11-AFFNI 84	13	Oyster	63	NEG	NEG	NEG	0.32
Carlingford Lough	C15-AFFNI 89	12	Oyster	NEG	NEG	NEG	NEG	<0.3
Carlingford Lough	C17-AFFNI 92	11	Oyster	NEG	NEG	NEG	NEG	<0.3
Carlingford Lough	C7-AFFNI 73	13	Oyster	NEG	NEG	NEG	NEG	<0.3
Carlingford Lough	C9-AFFNI 39	11	Oyster	NEG	NEG	NEG	NEG	<0.3
Carlingford Lough	NW-Wild Fishery	13	Mussel	NEG	NEG	NEG	NEG	<0.3
Dundrum Bay	DB1-AFFNI 95A	14	Oyster	30	NEG	NEG	NEG	<0.3
Dundrum Bay	DB1-AFFNI 95A	17	Mussel	261	NEG	NEG	NEG	<0.3
Dundrum Bay	DB2-AFFNI 95B	13	Mussel	170	NEG	NEG	NEG	0.74
Killough	K1-AFFNI 18	6	Mussel	43	NEG	NEG	NEG	<0.3
Killough	K1-AFFNI 18	13	Oyster	11	NEG	NEG	NEG	0.54
Larne Lough	L5-AFFNI 21B	10	Mussel	NEG	NEG	NEG	NEG	<0.3
Larne Lough	L5-AFFNI 21B	10	Oyster	NEG	NEG	NEG	NEG	<0.3
Larne Lough	L3-AFFNI 88	12	Oyster	NEG	NEG	NEG	NEG	<0.3
Lough Foyle	PA3M-Wild Fishery	12	Mussel	NEG	NEG	NEG	NEG	<0.3
Lough Foyle	PA3O-Wild Fishery	5	Oyster	NEG	NEG	NEG	NEG	<0.3
Lough Foyle	PA4M-Wild Fishery	12	Mussel	NEG	NEG	NEG	NEG	<0.3
Lough Foyle	PA4O- Wild Fishery	5	Oyster	NEG	NEG	NEG	NEG	<0.3
Strangford Lough	S7-AFFNI 76	12	Mussel	NEG	NEG	NEG	NEG	<0.3
Strangford Lough	S7-AFFNI 76	15	Oyster	NEG	NEG	NEG	NEG	0.33
Strangford Lough	S2-AFFNI 42	14	Mussel	60	NEG	NEG	NEG	<0.3

### **Proficiency Test Results for Methods used for Official Control Purposes in 2019**

Performance in proficiency tests is assessed using a Z-score. This is calculated for each participant's data. Each sample /matrix combination is given an assigned value and Z-score is calculated thus:

$$\text{Z-score} = \frac{\text{Mean from Laboratory} - \text{Assigned Value}}{\text{Total Error}}$$

The total error is based on values set for the proportional error and the constant error. These values are set by the organisers. The numbers in the z column indicate:

$|Z| < 2$  satisfactory performance

$2 < |Z| < 3$  questionable performance

$|Z| > 3$  unsatisfactory performance

### **Domoic Acid 2019 Proficiency Test Summaries**

**Table 6: EURL 2019 - HPLC**

Sample ID	Sample description	Assigned value	Reported value	Units	z-score
EURLMB/19/A/01	Shellfish homogenate	7.3	7.2	mg/kg	-0.10
EURLMB/19/A/02	Shellfish homogenate	76.5	77.9	mg/kg	0.10

**Table 7: Quasimeme Round 2019.1 - HPLC**

Sample ID	Sample description	Assigned value	Reported value	Units	z-score
QST260BT	Scallop tissue	27	26	mg/kg	-0.29
QST261BT	Queen scallop adductor muscle	28.1	29.5	mg/kg	0.39
QST262BT	Pacific oyster	8.4	8.3	mg/kg	-0.09

**Table 8: Quasimeme Round 2019.2 - HPLC**

Sample ID	Sample description	Assigned value	Reported value	Units	z-score
QST269BT	Oyster tissue	17.1	18.7	mg/kg	0.7
QST270BT	Queen scallop adductor muscle	28.3	32.2	mg/kg	1.1
QST271BT	Blue mussel	52.1	45.9	mg/kg	-0.9

**PSP 2019 Proficiency Test Summaries****Table 9: EURL 2019 - HPLC**

Sample ID	Matrix	Determinant	Assigned Value	Reported Value	Units	z-Score
<b>EURLMB/19/P/01</b>	<b>Shellfish homogenate</b>	<b>Total toxicity</b>	<b>967</b>	<b>1346</b>	<b>µgSTX2HCL eq./kg</b>	<b>2.40</b>
EURLMB/19/P/01	Shellfish homogenate	dcGTX-2,3	82.3	135.8	µgSTX2HCL eq./kg	2.50
EURLMB/19/P/01	Shellfish homogenate	dcSTX	642.8	908.7	µgSTX2HCL eq./kg	2.20
EURLMB/19/P/01	Shellfish homogenate	GTX-2,3	137.4	251.7	µgSTX2HCL eq./kg	3.50
EURLMB/19/P/01	Shellfish homogenate	GTX-5	3.4	ND	µgSTX2HCL eq./kg	
EURLMB/19/P/01	Shellfish homogenate	STX	24.4	17.9	µgSTX2HCL eq./kg	-1.10
EURLMB/19/P/01	Shellfish homogenate	dcNEO	58.4	ND	µgSTX2HCL eq./kg	
EURLMB/19/P/01	Shellfish homogenate	GTX-6	25.8	31.6	µgSTX2HCL eq./kg	0.90
<b>EURLMB/19/P/02</b>	<b>Shellfish homogenate</b>	<b>Total toxicity</b>	<b>1026.0</b>	<b>1312.0</b>	<b>µgSTX2HCL eq./kg</b>	<b>1.60</b>
EURLMB/19/P/02	Shellfish homogenate	C-1,2	149.5	231.9	µgSTX2HCL eq./kg	2.40
EURLMB/19/P/02	Shellfish homogenate	dcSTX	274.2	364.5	µgSTX2HCL eq./kg	1.60
EURLMB/19/P/02	Shellfish homogenate	GTX-2,3	53.0	78.5	µgSTX2HCL eq./kg	1.90
EURLMB/19/P/02	Shellfish homogenate	GTX-5	194.2	232.5	µgSTX2HCL eq./kg	0.90
EURLMB/19/P/02	Shellfish homogenate	dcNEO	36.7	ND	µgSTX2HCL eq./kg	
EURLMB/19/P/02	Shellfish homogenate	C-3,4	59.7	81.1	µgSTX2HCL eq./kg	1.30
EURLMB/19/P/02	Shellfish homogenate	GTX-6	147.8	173.6	µgSTX2HCL eq./kg	0.70
<b>EURLMB/19/P/03</b>	<b>Shellfish homogenate</b>	<b>Total toxicity</b>	<b>645.0</b>	<b>788.0</b>	<b>µgSTX2HCL eq./kg</b>	<b>1.20</b>
EURLMB/19/P/03	Shellfish homogenate	GTX-2,3	358.2	511.6	µgSTX2HCL eq./kg	2.20
EURLMB/19/P/03	Shellfish homogenate	STX	253.7	276.2	µgSTX2HCL eq./kg	0.50

**Table 10: Quasimeme Round 2019.1 - HPLC**

Sample ID	Sample description	Determinant	Assigned Value	Reported Value	Units	z-score
QST 266BT	Mussel tissue	GTX-2,3	3.21	3.04	µmol/kg	-0.37
QST 266BT	Mussel tissue	STX	1.74	1.57	µmol/kg	-0.62
<b>QST 266BT</b>	<b>Mussel tissue</b>	<b>Total toxicity</b>	<b>1334</b>	<b>1263</b>	<b>µgSTXdiHCleq./kg</b>	<b>-0.42</b>
QST 267BT	Mussel tissue	GTX-2,3	2.94	2.77	µmol/kg	-0.38
QST 267BT	Mussel tissue	STX	1.41	1.3	µmol/kg	-0.48
<b>QST 267BT</b>	<b>Mussel tissue</b>	<b>Total toxicity</b>	<b>1156</b>	<b>1101</b>	<b>µgSTXdiHCleq./kg</b>	<b>-0.37</b>
QST 268BT	Mussel tissue	dc-Neo	0.21	0.26	µmol/kg	0.48
QST 268BT	Mussel tissue	dc-STX	1.87	1.38	µmol/kg	-1.54
QST 268BT	Mussel tissue	GTX-2,3	0.07	0.07	µmol/kg	0.00
QST 268BT	Mussel tissue	STX	0.08	0.06	µmol/kg	-0.33
<b>QST 268BT</b>	<b>Mussel tissue</b>	<b>Total toxicity</b>	<b>762.4</b>	<b>592</b>	<b>µgSTXdiHCleq./kg</b>	<b>-1.54</b>

Table 11: Quasimeme Round 2019.2 - HPLC

Sample ID	Sample description	Determinant	Assigned Value	Reported Value	Units	z-score
QST275BT	Mussel tissue	GTX-2,3	5.02	4.56	µmol/kg	-0.5
QST275BT	Mussel tissue	STX	3.4	3.24	µmol/kg	-0.3
<b>QST275BT</b>	<b>Mussel tissue</b>	<b>Total toxicity</b>	<b>2327</b>	<b>2224</b>	<b>µgSTXdiHCleq./kg</b>	<b>-0.3</b>
QST276BT	Mussel tissue	dc-STX	0.51	0.44	µmol/kg	-0.6
QST276BT	Mussel tissue	GTX-2,3	5.35	4.98	µmol/kg	-0.4
QST276BT	Mussel tissue	STX	1.27	1.11	µmol/kg	-0.7
<b>QST276BT</b>	<b>Mussel tissue</b>	<b>Total toxicity</b>	<b>1768</b>	<b>1689</b>	<b>µgSTXdiHCleq./kg</b>	<b>-0.3</b>
QST277BT	Mussel tissue	GTX-2,3	6.85	6.26	µmol/kg	-0.5
QST277BT	Mussel tissue	STX	1.88	1.66	µmol/kg	-0.7
<b>QST277BT</b>	<b>Mussel tissue</b>	<b>Total toxicity</b>	<b>2163</b>	<b>2012</b>	<b>µgSTXdiHCleq./kg</b>	<b>-0.5</b>

### Lipophilic Toxins 2019 Proficiency Test Summaries

Table 12: EURL 2019 - LC-MS/MS

Sample ID	Matrix	Determinant	Assigned Value	Reported Value	Units	z-score
<b>EURLMB/19/L/01</b>	<b>Mussel homogenate</b>	<b>Total OA group</b>	<b>1659.5</b>	<b>1435.8</b>	<b>µg OA eq./kg</b>	<b>-0.80</b>
EURLMB/19/L/01	Mussel homogenate	Free OA	200.6	150.0	µg/kg	-1.20
EURLMB/19/L/01	Mussel homogenate	Free DTX2	165.0	123.0	µg/kg	-1.10
EURLMB/19/L/01	Mussel homogenate	Total OA	1418.8	1266.0	µg/kg	-0.70
EURLMB/19/L/01	Mussel homogenate	Total DTX2	330.2	283.0	µg/kg	-0.80
<b>EURLMB/19/L/01</b>	<b>Mussel homogenate</b>	<b>Total YTX</b>	<b>3.0</b>	<b>3.0</b>	<b>mg YTX eq./kg</b>	<b>0.10</b>
EURLMB/19/L/01	Mussel homogenate	YTX	0.2	0.2	mg/kg	0.00
EURLMB/19/L/01	Mussel homogenate	homo-YTX	2.1	1.9	mg/kg	-0.50
EURLMB/19/L/01	Mussel homogenate	45 OH YTX	0.3	0.2	mg/kg	-0.80
EURLMB/19/L/01	Mussel homogenate	45 OH homo YTX	1.2	1.5	mg/kg	1.40
<b>EURLMB/19/L/02</b>	<b>Mussel homogenate</b>	<b>Total OA group</b>	<b>82.1</b>	<b>47.2</b>	<b>µg OA eq./kg</b>	<b>-1.90</b>
EURLMB/19/L/02	Mussel homogenate	Free OA	43.5	27.8	µg/kg	-1.60
EURLMB/19/L/02	Mussel homogenate	Total OA	80.7	47.2	µg/kg	-1.80
<b>EURLMB/19/L/02</b>	<b>Mussel homogenate</b>	<b>AZA group</b>	<b>476.5</b>	<b>451.3</b>	<b>µg AZA eq./kg</b>	<b>-0.30</b>
EURLMB/19/L/02	Mussel homogenate	AZA1	262.2	253.0	µg/kg	-0.20
EURLMB/19/L/02	Mussel homogenate	AZA2	73.8	74.1	µg/kg	0.00
EURLMB/19/L/02	Mussel homogenate	AZA3	55.2	46.4	µg/kg	-0.70
<b>EURLMB/19/L/03</b>	<b>Mussel homogenate</b>	<b>Total OA group</b>	<b>904.9</b>	<b>877.4</b>	<b>µg OA eq./kg</b>	<b>-0.20</b>
EURLMB/19/L/03	Mussel homogenate	Free OA	20.8	14.8	µg/kg	-1.20
EURLMB/19/L/03	Mussel homogenate	Free DTX1	225.2	229	µg/kg	0.10
EURLMB/19/L/03	Mussel homogenate	Total OA	49.4	23.4	µg/kg	-2.10
EURLMB/19/L/03	Mussel homogenate	Total DTX1	787.7	854	µg/kg	0.40

Table 13: Quasimeme Round 2019.1- LC-MS/MS

Sample ID	Sample Description	Determinant	Assigned Value	Reported Value	Units	z-Score
QST263BT	Mussel tissue	45-OH-homo-YTX	0.51	0.60	mg/kg	1.09
QST263BT	Mussel tissue	45-OH-YTX	0.12	0.15	mg/kg	1.17
QST263BT	Mussel tissue	AZA-1	737.7	639	µg/kg	-1.06
QST263BT	Mussel tissue	AZA-2	209.6	217	µg/kg	0.28
QST263BT	Mussel tissue	AZA-3	124.7	110	µg/kg	-0.91
<b>QST263BT</b>	<b>Mussel tissue</b>	<b>AZA-total</b>	<b>1303.6</b>	<b>1183</b>	<b>µg AZA eq./kg</b>	<b>-0.73</b>
QST263BT	Mussel tissue	Free-DTX1	85.8	71.2	µg/kg	-1.27
QST263BT	Mussel tissue	Free-DTX2	567.2	520	µg/kg	-0.65
QST263BT	Mussel tissue	free-Okadaic-Acid	149.1	134	µg/kg	-0.79
QST263BT	Mussel tissue	Homo-YTX	1.1	1.04	mg/kg	-0.37
<b>QST263BT</b>	<b>Mussel tissue</b>	<b>Total OA group + PTX group</b>	<b>904.1</b>	<b>804</b>	<b>µg OA eq./kg</b>	<b>-0.87</b>
QST263BT	Mussel tissue	Total DTX1	112.6	101	µg/kg	-0.79
QST263BT	Mussel tissue	Total DTX2	786.6	690	µg/kg	-0.95
<b>QST263BT</b>	<b>Mussel tissue</b>	<b>Total-free-OA+DTX1+DTX2</b>	<b>562.9</b>	<b>517</b>	<b>µg OA eq./kg</b>	<b>-0.63</b>
<b>QST263BT</b>	<b>Mussel tissue</b>	<b>Total-hy-OA+DTX1+DTX2</b>	<b>924.4</b>	<b>804</b>	<b>µg OA eq./kg</b>	<b>-1.01</b>
QST263BT	Mussel tissue	Total okadaic acid	<b>339.1</b>	<b>289</b>	µg/kg	<b>-1.14</b>
<b>QST263BT</b>	<b>Mussel tissue</b>	<b>Total-YTX</b>	<b>1.76</b>	<b>1.75</b>	<b>mg YTX eq./kg</b>	<b>-0.03</b>
QST263BT	Mussel tissue	YTX	0.23	0.26	mg/kg	0.79
QST264BT	Mussel extract	AZA-1	97	87	µg/kg	-0.77
QST264BT	Mussel extract	AZA-2	20.5	22.8	µg/kg	0.84
QST264BT	Mussel extract	AZA-3	36.8	32.3	µg/kg	-0.93
<b>QST264BT</b>	<b>Mussel extract</b>	<b>AZA-total</b>	<b>187</b>	<b>173.6</b>	<b>µg AZA eq./kg</b>	<b>-0.54</b>
QST264BT	Mussel extract	Free-DTX2	3.9	3.6	µg/kg	-0.50
QST264BT	Mussel extract	free-Okadaic-Acid	38.7	37.9	µg/kg	-0.16
<b>QST264BT</b>	<b>Mussel extract</b>	<b>Total OA group + PTX group</b>	<b>47.9</b>	<b>49.8</b>	<b>µg OA eq./kg</b>	<b>0.31</b>
QST264BT	Mussel extract	Total-DTX2	4.1	3.4	µg/kg	-1.20
<b>QST264BT</b>	<b>Mussel extract</b>	<b>Total-free-OA+DTX1+DTX2</b>	<b>41.3</b>	<b>40</b>	<b>µg OA eq./kg</b>	<b>-0.23</b>
<b>QST264BT</b>	<b>Mussel extract</b>	<b>Total-hy-OA+DTX1+DTX2</b>	<b>48.4</b>	<b>49.8</b>	<b>µg OA eq./kg</b>	<b>0.22</b>
QST264BT	Mussel extract	Total-Okadaic-Acid	46	47.7	µg/kg	0.29
QST265BT	Mussel	AZA-1	422.2	367	µg/kg	-1.02
QST265BT	Mussel	AZA-2	118.6	130	µg/kg	0.75
QST265BT	Mussel	AZA-3	84.7	72.9	µg/kg	-1.06
<b>QST265BT</b>	<b>Mussel</b>	<b>AZA-total</b>	<b>767.5</b>	<b>703</b>	<b>µg AZA eq./kg</b>	<b>-0.66</b>
QST265BT	Mussel	Free-DTX2	101.4	82.8	µg/kg	-1.41
QST265BT	Mussel	free-Okadaic-Acid	45.9	35.8	µg/kg	-1.69
QST265BT	Mussel	Total-DTX2	<b>146.5</b>	<b>119</b>	µg/kg	<b>-1.44</b>
<b>QST265BT</b>	<b>Mussel</b>	<b>Total-free-OA+DTX1+DTX2</b>	<b>106.9</b>	<b>85.5</b>	<b>µg OA eq./kg</b>	<b>-1.52</b>
<b>QST265BT</b>	<b>Mussel</b>	<b>Total-hy-OA+DTX1+DTX2</b>	<b>186.3</b>	<b>154.4</b>	<b>µg OA eq./kg</b>	<b>-1.33</b>
QST265BT	Mussel	Total-Okadaic-Acid	99.1	83	µg/kg	-1.23

Table 14: Quasimeme Round 2019.2- LC-MS/MS

Sample ID	Sample Description	Determinant	Assigned Value	Reported Value	Units	z-Score
QST272BT	Mussel tissue	Free-DTX2	407	392.4	µg/kg	-0.3
QST272BT	Mussel tissue	Free-Okadaic acid	153	142.6	µg/kg	-0.5
<b>QST272BT</b>	<b>Mussel tissue</b>	<b>Total-free-OA+DTX1+DTX2</b>	<b>404</b>	<b>378.1</b>	<b>µg OA eq./kg</b>	<b>-0.5</b>
QST272BT	Mussel tissue	Total-DTX2	706	693.7	µg/kg	-0.1
QST272BT	Mussel tissue	Total-Okadaic acid	484	475.2	µg/kg	-0.1
<b>QST272BT</b>	<b>Mussel tissue</b>	<b>Total-hy-OA+DTX1+DTX2</b>	<b>920</b>	<b>891.4</b>	<b>µg OA eq./kg</b>	<b>-0.2</b>
<b>QST272BT</b>	<b>Mussel tissue</b>	<b>Total OA group + PTX group</b>	<b>924</b>	<b>891.4</b>	<b>µg OA eq./kg</b>	<b>-0.3</b>
QST273BT	Mussel extract	AZA-1	13.6	10.7	µg/kg	-1.6
QST273BT	Mussel extract	AZA-2	3.87	3.5	µg/kg	-0.7
QST273BT	Mussel extract	AZA-3	3.94	3.9	µg/kg	-0.1
<b>QST273BT</b>	<b>Mussel extract</b>	<b>AZA-total</b>	<b>25.4</b>	<b>22.5</b>	<b>µg AZA eq./kg</b>	<b>-0.9</b>
QST273BT	Mussel extract	Free-DTX2	60.8	53.4	µg/kg	-0.9
QST273BT	Mussel extract	Free-Okadaic Acid	11.0	10.5	µg/kg	-0.3
<b>QST273BT</b>	<b>Mussel extract</b>	<b>Total-free-OA+DTX1+DTX2</b>	<b>49.4</b>	<b>42.5</b>	<b>µg OA eq./kg</b>	<b>-1.1</b>
QST273BT	Mussel extract	Total-DTX2	74.2	68.8	µg/kg	-0.5
QST273BT	Mussel extract	Total-Okadaic Acid	18.7	16.7	µg/kg	-0.8
<b>QST273BT</b>	<b>Mussel extract</b>	<b>Total-hy-OA+DTX1+DTX2</b>	<b>63.0</b>	<b>57.9</b>	<b>µg OA eq./kg</b>	<b>-0.6</b>
<b>QST273BT</b>	<b>Mussel extract</b>	<b>Total OA group + PTX group</b>	<b>64.4</b>	<b>57.9</b>	<b>µg OA eq./kg</b>	<b>-0.8</b>
QST273BT	Mussel extract	YTX	0.031	0.031	mg/kg	0.0
QST273BT	Mussel extract	Homo-YTX	0.302	0.328	mg/kg	0.5
QST273BT	Mussel extract	45-OH-homo-YTX	0.174	0.196	mg/kg	0.6
QST273BT	Mussel extract	45-OH-YTX	0.023	0.025	mg/kg	0.1
<b>QST273BT</b>	<b>Mussel extract</b>	<b>Total-YTX</b>	<b>0.432</b>	<b>0.481</b>	<b>mg YTX eq./kg</b>	<b>0.7</b>
QST274BT	Blue mussel	AZA-1	218	180.8	mg/kg	-1.3
QST274BT	Blue mussel	AZA-2	59	59.2	mg/kg	0.0
QST274BT	Blue mussel	AZA-3	49.6	50.9	µg/kg	0.2
<b>QST274BT</b>	<b>Blue mussel</b>	<b>AZA-total</b>	<b>392</b>	<b>358.5</b>	<b>µg AZA eq./kg</b>	<b>-0.7</b>
QST274BT	Blue mussel	Free-DTX2	297	284.7	µg/kg	-0.3
QST274BT	Blue mussel	free-Okadaic-Acid	67.5	57.9	µg/kg	-1.1
<b>QST274BT</b>	<b>Blue mussel</b>	<b>Total-free-OA+DTX1+DTX2</b>	<b>250</b>	<b>228.7</b>	<b>µg OA eq./kg</b>	<b>-0.6</b>
QST274BT	Blue mussel	Total-DTX2	439	368.6	µg/kg	-1.2
QST274BT	Blue mussel	Total-Okadaic-Acid	156	125.5	µg/kg	-1.5
<b>QST274BT</b>	<b>Blue mussel</b>	<b>Total-hy-OA+DTX1+DTX2</b>	<b>435</b>	<b>346.7</b>	<b>µg OA eq./kg</b>	<b>-1.6</b>
<b>QST274BT</b>	<b>Blue mussel</b>	<b>Total OA group + PTX group</b>	<b>433</b>	<b>346.7</b>	<b>µg/kg</b>	<b>-1.5</b>



### **Overall Summary of Proficiency Tests**

The proficiency tests for domoic acid were 100% satisfactory (8/8).

For PSP they were 84% satisfactory (31/37); both rounds of the Quasimeme tests were 100% satisfactory but for the EURL there were 5 questionable and 1 unsatisfactory z-scores. The EURL report indicated that there were some problems with the identification and quantification of dcNEO in sample 1 with only half of participants identifying it. The sample was homogenised clam tissue originating from Spain during an episode of *Gymnodinium catenatum*, the toxin profiles of which have previously been particularly problematic to determine. The EURL report provided z-scores for total toxicity with and without the contribution of dcNeo and without it our z-score was 0.4 (satisfactory). The z-scores with the contribution of dcNeo and all other analytes were z'-scores (z prime) indicating a degree of uncertainty for the assigned value. Analysis of samples 2 and 3 led to one questionable z-score for each. Sample 2 was a homogenate of mussels again displaying a typical *Gymnodinium catenatum* profile. For this sample only 35% of participants identified dcNeo and again the scores for all analytes were given as z'-scores. The failing z-scores were exclusively by overestimation of the assigned values and so may be attributed to the application of recovery correction creating falsely exaggerated results; this is not applied for the reporting of routine samples.

The lipophilic exercises were 99% satisfactory (94/95). There was a single questionable z-score (-2.1) in the EURL exercise for the hydrolysed OA result for sample 3 but the total toxicity was satisfactory as was the hydrolysed OA results for samples 1 and 2.

Internal non-conformance reports have been raised on our quality assurance system to address the discrepancies.

Overall performance for the three toxin groups in the three proficiency tests is 95% satisfactory (133/140), 4.3% questionable and 0.7% unsatisfactory.