QUASIMEME

Quality assurance of information for marine environmental monitoring

Certificate of Analysis

Biota

REFERENCE MATERIAL

Biota sample 333

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Biota 333

General Information

In this report an overview is given of analytical data for this sample collected in our proficiency testing program. The consensus values are calculated using a robust statistical model. With this NDA model mean and standard deviation are calculated using all reported data when at least 4 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into two sections: Consensus Values and Indicative Values. The division is made on the reliability of the data. Consensus Values are based on at least 10 results while the relative uncertainty is smaller than 6.25%. Indicative Values are based on a relative uncertainty of maximum 35% with at least 4 and less than 10 results or a relative uncertainty higher than 6.25%.

For each determinand the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median, MAD (Median of Absolute Deviation) and the uncertainty in the assigned value. The confidence limits (at 95 % probabilty) are calculated for these determinands.

The results of each determinand is expressed on a wet weight basis.

Sample information

QUASIMEME reference materials cover a range of natural Biota species from contaminated waters from the North Sea and/or Mediterranean. The supplied wet test materials are homogenised and sterilised by autoclaving.

This Biota sample 333 of Mussels from Denmark is prepared for the QUASIMEME proficiency programs. The results on which the values in this report are based were taken from the periods given in the following table.

Year.Round	Program	Sample Round Id
2015.2	BT4	QPH079BT
2014.2	BT4	QPH075BT
2014.1	BT1	QTM102BT

Consensus Values BT1

Method: Metals - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Arsenic	mg/kg	2.00	0.126	6.3	32	2.00	0.087	0.028	1.95 - 2.04
Cadmium	µg/kg	103	8.3	8.1	35	103	6.0	1.8	100.2 - 105.9
Cobalt	µg/kg	137	12.6	9.2	11	139	8.9	4.7	128 - 145
Copper	µg/kg	1400	104	7.4	35	1390	73	22	1362 - 1434
Iron	mg/kg	50.5	2.80	5.5	11	50.8	2.00	1.06	48.7 - 52.4
Lead	µg/kg	177	14.4	8.1	31	179	9.5	3.2	172 - 183
Manganese	µg/kg	3530	216	6.1	12	3530	154	78	3399 - 3671
Mercury	µg/kg	25.8	3.31	12.8	33	25.9	2.28	0.72	24.7 - 27.0
Nickel	µg/kg	404	49.9	12.3	28	406	35.0	11.8	385 - 424
Selenium	µg/kg	717	79.9	11.1	20	718	57.5	22.3	680 - 754
Silver	µg/kg	12.6	1.39	11.1	17	12.4	0.96	0.42	11.9 - 13.3
Zinc	mg/kg	24.2	1.76	7.3	34	24.1	1.17	0.38	23.6 - 24.8

Method: Weight - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Dry-weight	%	22.4	0.42	1.9	23	22.5	0.30	0.11	22.20 - 22.56

Indicative Values BT1

Method: Metals - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Aluminium	mg/kg	24.5	8.78	35.8	5	24.8	5.95	4.91	14.4 - 34.6
Antimony	µg/kg	3.05	0.475	15.6	4	3.22	0.360	0.297	2.39 - 3.71
Barium	µg/kg	405	37.8	9.3	7	400	27.0	17.8	371 - 439
Chromium	µg/kg	291	76.3	26.2	27	280	54.0	18.4	261 - 321
Molybdene	µg/kg	164	24.4	14.9	7	167	17.0	11.5	142 - 185
Tin	µg/kg	82.4	41.59	50.5	8	99.0	32.30	18.38	48.5 - 116
Uranium	µg/kg	25.6	0.14	0.6	5	25.6	0.10	0.08	25.43 - 25.76
Vanadium	µg/kg	192	44.3	23.1	10	200	32.0	17.5	161 - 223

Method: Weight - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Ash-Weight	%	1.86	0.246	13.2	5	1.94	0.205	0.138	1.57 - 2.14

Method: Lipids - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Total-Lipid	%	3.20	0.120	3.8	7	3.20	0.090	0.057	3.09 - 3.31

Consensus Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Benzo[a]anthracene	µg/kg	1.58	0.331	21.0	43	1.57	0.220	0.063	1.48 - 1.68
Benzo[a]pyrene	µg/kg	0.382	0.1150	30.1	39	0.404	0.0840	0.0230	0.345 - 0.420
Benzo[b]fluoranthene	µg/kg	1.14	0.261	23.0	37	1.18	0.180	0.054	1.05 - 1.22
Benzo[g,h,i]perylene	µg/kg	0.716	0.1595	22.3	38	0.727	0.1130	0.0323	0.663 - 0.768
Chrysene	µg/kg	3.15	0.388	12.3	37	3.13	0.257	0.080	3.02 - 3.28
Fluoranthene	µg/kg	13.5	1.99	14.7	42	13.7	1.34	0.38	12.9 - 14.1
Fluorene	µg/kg	3.70	0.955	25.8	31	3.58	0.660	0.214	3.35 - 4.05
Phenanthrene	µg/kg	24.7	3.54	14.3	39	24.5	2.34	0.71	23.6 - 25.9
Pyrene	µg/kg	5.96	1.228	20.6	40	6.11	0.864	0.243	5.57 - 6.36

Method: Lipids - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Total-Lipid	%	2.94	0.475	16.1	16	3.00	0.325	0.148	2.69 - 3.20

Indicative Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Acenaphthene	µg/kg	0.439	0.3289	74.8	24	0.448	0.2300	0.0839	0.301 - 0.578
Acenaphthylene	µg/kg	0.469	0.1806	38.5	21	0.510	0.1250	0.0493	0.387 - 0.551
Anthracene	µg/kg	0.391	0.1848	47.3	28	0.406	0.1305	0.0437	0.320 - 0.463
Benzo[a]fluorene	µg/kg	0.750	0.3293	43.9	4	0.764	0.2050	0.2058	0.293 - 1.21
Benzo[e]pyrene	µg/kg	1.81	0.460	25.4	23	1.82	0.315	0.120	1.61 - 2.01
Benzo[k]fluoranthene	µg/kg	0.537	0.1974	36.7	34	0.590	0.1360	0.0423	0.468 - 0.606
Chrysene + Triphenylene	µg/kg	4.10	0.969	23.6	12	4.23	0.694	0.350	3.49 - 4.71
Dibenz[ah]anthracene	µg/kg	0.136	0.0803	59.2	25	0.150	0.0566	0.0201	0.103 - 0.169
Dibenzothiophene	µg/kg	0.497	0.2489	50.1	12	0.518	0.1700	0.0898	0.341 - 0.654
Indeno[1,2,3-cd]pyrene	µg/kg	0.404	0.1993	49.4	32	0.435	0.1465	0.0440	0.332 - 0.475
Naphthalene	µg/kg	1.70	0.419	24.7	24	1.76	0.290	0.107	1.52 - 1.88
Perylene	µg/kg	1.15	0.228	19.9	11	1.11	0.144	0.086	0.996 - 1.30
Triphenylene	µg/kg	1.67	0.327	19.6	6	1.72	0.229	0.167	1.35 - 2.00
1-methylnaphtalene	µg/kg	0.957	0.1480	15.5	6	1.015	0.1175	0.0755	0.809 - 1.10
2-methylnaphtalene	µg/kg	1.19	0.102	8.6	6	1.23	0.081	0.052	1.08 - 1.29
2-methylphenanthrene	µg/kg	2.61	0.692	26.4	11	2.50	0.429	0.261	2.16 - 3.07
3-6-dimethylphenanthrene	µg/kg	0.584	0.1825	31.3	6	0.640	0.1215	0.0932	0.401 - 0.766
C1-phenanthrenes/anthracenes	µg/kg	7.81	2.932	37.5	4	7.77	1.918	1.833	3.74 - 11.9

Method: Lipids - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Extractable-Lipid	%	2.83	0.192	6.8	5	2.93	0.160	0.107	2.61 - 3.05