QUASIMEME

Quality assurance of information for marine environmental monitoring

Certificate of Analysis

Biota

REFERENCE MATERIAL

Biota sample 358

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Biota 358

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 358 of Mussels spiked with contaminants from Kattegat 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
2023.2	BT1	QTM142BT
2022.1	BT4	QPH105BT
2018.1	BT4	QPH090BT

Consensus Values BT1

Method: Metals - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Mercury	µg/kg	17.6	1.99	11.3	29	17.9	1.24	0.46	16.9 - 18.4
Copper	µg/kg	1497	118.4	7.9	20	1486	76.5	33.1	1442 - 1552
Cadmium	µg/kg	146	11.7	8.0	21	146	5.0	3.2	141 - 152
Lead	µg/kg	231	17.3	7.5	20	227	10.1	4.8	223 - 239
Manganese	µg/kg	6768	666.7	9.9	12	6820	484.9	240.6	6348 - 7187
Selenium	µg/kg	532	55.1	10.4	13	524	37.9	19.1	499 - 565
Arsenic	mg/kg	1.50	0.090	6.0	22	1.50	0.047	0.024	1.46 - 1.54
Chromium	µg/kg	130	13.0	10.0	17	131	7.5	3.9	124 - 137
Nickel	µg/kg	273	13.1	4.8	18	270	8.3	3.9	266 - 279
Zinc	mg/kg	31.8	1.60	5.0	20	31.9	1.10	0.45	31.0 - 32.5

Method: Weight - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Dry-weight	%	20.5	0.20	1.0	20	20.6	0.09	0.06	20.44 - 20.64

Indicative Values BT1

Method: Metals - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Aluminium	mg/kg	7.36	1.627	22.1	8	7.51	1.215	0.719	6.03 - 8.68
Cobalt	µg/kg	69.4	4.27	6.2	9	70.6	2.13	1.78	66.2 - 72.6
Iron	mg/kg	45.0	8.47	18.8	12	44.9	4.82	3.05	39.7 - 50.3
Silver	µg/kg	6.34	0.736	11.6	6	6.42	0.490	0.376	5.61 - 7.08
Vanadium	µg/kg	196	10.2	5.2	6	199	6.1	5.2	185 - 206
Tin	µg/kg	-	-	-	5	37.2	16.5	-	- - -
Magnesium	mg/kg	-	-	-	4	429	16.0	-	- - -
Molybdene	µg/kg	114	6.3	5.6	8	114	3.5	2.8	108 - 119
Antimony	µg/kg	-	-	-	4	3.12	0.7	-	- - -
Barium	µg/kg	806	153.1	19.0	6	818	84.5	78.1	653 - 958
Uranium	µg/kg	29.5	1.46	5.0	7	30.0	1.42	0.69	28.2 - 30.8

Method: Lipids - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Total-Lipid	%	1.95	0.465	23.8	6	1.95	0.257	0.237	1.49 - 2.41

Consensus Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Indeno[1,2,3-cd]pyrene	µg/kg	2.84	0.592	20.8	30	2.88	0.342	0.135	2.62 - 3.06
Phenanthrene	µg/kg	21.9	4.78	21.9	36	22.1	3.21	1.00	20.3 - 23.5
Pyrene	µg/kg	36.1	6.98	19.3	35	35.2	4.30	1.47	33.7 - 38.5
Benzo[g,h,i]perylene	µg/kg	6.33	1.073	17.0	35	6.29	0.658	0.227	5.96 - 6.70
Fluoranthene	µg/kg	30.6	5.13	16.8	41	30.1	3.30	1.00	29.0 - 32.2
Benzo[a]anthracene	µg/kg	16.6	3.69	22.2	39	17.3	2.80	0.74	15.4 - 17.8
Benzo[b]fluoranthene	µg/kg	8.27	1.373	16.6	33	8.25	0.760	0.299	7.79 - 8.76
Benzo[a]pyrene	µg/kg	4.10	0.807	19.7	41	4.03	0.530	0.158	3.85 - 4.36
Benzo[k]fluoranthene	µg/kg	5.36	0.871	16.2	30	5.46	0.477	0.199	5.04 - 5.69
Anthracene	µg/kg	3.28	0.637	19.4	35	3.30	0.300	0.135	3.06 - 3.50

Method: Lipids - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Total-Lipid	%	2.28	0.318	13.9	18	2.29	0.196	0.094	2.12 - 2.44

Indicative Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Chrysene + Triphenylene	µg/kg	20.4	3.61	17.7	11	20.0	1.99	1.36	18.0 - 22.8
Benzo[e]pyrene	µg/kg	8.53	1.805	21.2	14	8.40	1.130	0.603	7.49 - 9.56
Naphthalene	µg/kg	3.37	1.867	55.5	19	3.66	1.148	0.536	2.47 - 4.26
Dibenz[ah]anthracene	µg/kg	0.399	0.1473	36.9	15	0.420	0.0800	0.0476	0.318 - 0.480
Fluorene	µg/kg	2.35	0.821	35.0	26	2.41	0.482	0.201	2.02 - 2.68
Acenaphthylene	µg/kg	2.37	0.958	40.4	21	2.49	0.610	0.261	1.94 - 2.81
Dibenzothiophene	µg/kg	1.75	0.458	26.1	8	1.78	0.273	0.203	1.38 - 2.13
3-6-dimethylphenanthrene	µg/kg	5.67	1.570	27.7	7	5.86	1.020	0.742	4.27 - 7.08
2-methylphenanthrene	µg/kg	11.0	1.58	14.4	7	10.6	0.90	0.75	9.54 - 12.4
1-methylpyrene	µg/kg	-	-	-	4	5.88	1.4	-	- - -
Perylene	µg/kg	1.85	0.449	24.3	6	1.83	0.294	0.229	1.40 - 2.30
Triphenylene	µg/kg	-	-	-	5	6.38	0.2	-	- - -
Chrysene	µg/kg	13.8	4.12	29.9	33	14.3	2.43	0.90	12.3 - 15.2
Acenaphthene	µg/kg	1.70	0.987	58.1	22	1.84	0.575	0.263	1.26 - 2.14
1-methylnaphtalene	µg/kg	-	-	-	4	0.690	0.2	-	- - -
2-methylnaphtalene	µg/kg	-	-	-	4	0.500	0.0	-	- - -
C1-phenanthren.+ anthracen.	µg/kg	-	-	-	5	17.7	3.1	-	- - -
C2-phenanthren.+ anthracen.	µg/kg	-	-	-	5	10.1	3.5	-	- - -