QUASIMEME

Quality assurance of information for marine environmental monitoring

Certificate of Analysis

Biota

REFERENCE MATERIAL

Biota sample 374

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Biota 374

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 374 of Mussel from Yerseke, the Netherlands 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
2023.1	BT1	QTM139BT
2023.1	BT2	QOR155BT
2022.2	BT10	QPF029BT
2022.2	BT4	QPH108BT
2022.2	BT8	QSP084BT

Consensus Values BT1

Method: Metals - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Mercury	µg/kg	25.0	2.30	9.2	25	25.1	1.78	0.57	24.1 - 26.0
Copper	µg/kg	2790	178.6	6.4	23	2809	111.0	46.5	2713 - 2867
Cadmium	µg/kg	98.1	7.60	7.7	22	97.5	3.65	2.02	94.8 - 101.5
Lead	µg/kg	166	16.6	10.0	22	166	10.0	4.4	158 - 173
Cobalt	µg/kg	162	15.7	9.7	12	163	9.0	5.7	152 - 172
Iron	mg/kg	89.7	6.41	7.1	15	90.8	3.17	2.07	86.2 - 93.2
Manganese	µg/kg	3916	412.8	10.5	16	3932	308.5	129.0	3697 - 4135
Selenium	µg/kg	675	41.5	6.1	16	670	20.0	13.0	653 - 697
Arsenic	mg/kg	1.78	0.110	6.2	24	1.77	0.055	0.028	1.73 - 1.83
Chromium	µg/kg	445	56.3	12.7	19	446	34.0	16.1	418 - 472
Nickel	µg/kg	482	25.4	5.3	22	483	19.0	6.8	470 - 493
Zinc	mg/kg	21.7	1.88	8.7	23	21.7	1.10	0.49	20.9 - 22.5
Vanadium	µg/kg	273	38.8	14.2	10	267	28.5	15.3	246 - 301

Method: Weight - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Dry-weight	%	22.2	0.34	1.5	17	22.2	0.20	0.10	22.00 - 22.35

Indicative Values BT1

Method: Metals - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Aluminium	mg/kg	78.3	21.91	28.0	10	74.8	16.55	8.66	62.9	-	93.7
Lithium	µg/kg	-	-	-	4	121	7.5	-	-	-	-
Silver	µg/kg	11.8	0.97	8.2	9	11.9	0.50	0.40	11.1	-	12.5
Tin	µg/kg	-	-	-	5	48.9	5.6	-	-	-	-
Sodium	mg/kg	-	-	-	5	5220	180.0	-	-	-	-
Magnesium	mg/kg	420	58.5	13.9	7	425	35.0	27.7	368	-	473
Potassium	mg/kg	-	-	-	5	1589	111.5	-	-	-	-
Calcium	mg/kg	-	-	-	5	710	93.4	-	-	-	-
Molybdene	µg/kg	190	18.6	9.7	7	190	9.4	8.8	174	-	207
Antimony	µg/kg	-	-	-	5	4.26	0.6	-	-	-	-
Barium	µg/kg	-	-	-	4	922	14.0	-	-	-	-
Thallium	µg/kg	-	-	-	4	1.84	0.1	-	-	-	-
Uranium	µg/kg	-	-	-	5	21.4	0.5	-	-	-	-

Method: Lipids - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Total-Lipid	%	-	-	-	5	3.80	0.7	-	-	-	-

Indicative Values BT10

Method: Perfluorinated alkyl substances - BT10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
n-PFOS	µg/kg	0.190	0.0823	43.3	9	0.216	0.0560	0.0343	0.128 - 0.252
PFOA	µg/kg	-	-	-	5	0.100	0.1	-	- - -
PFNA	µg/kg	-	-	-	5	0.100	0.1	-	- - -
PFDA	µg/kg	0.0519	0.0048	9.3	6	0.0530	0.0025	0.0025	0.0471 - 0.0567
PFUnDA	µg/kg	0.0498	0.0307	61.8	6	0.0594	0.0140	0.0157	0.0191 - 0.0805
PFDoA	µg/kg	0.0811	0.0487	60.1	6	0.0783	0.0238	0.0249	0.0324 - 0.130
PFTrDA	µg/kg	0.0729	0.0451	61.8	7	0.0769	0.0255	0.0213	0.0326 - 0.113
PFTeDA	µg/kg	-	-	-	5	0.131	0.1	-	- - -
total-PFOS	µg/kg	0.198	0.0636	32.2	9	0.204	0.0440	0.0265	0.150 - 0.245

Indicative Values BT2

Method: Chlorinated organics - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Dieldrin	µg/kg	-	-	-	4	0.250	0.1	-	-	-	-
pp'-DDE	µg/kg	1.74	0.364	20.9	12	1.72	0.180	0.131	1.51	-	1.97
pp'-DDD	µg/kg	0.159	0.0268	16.8	9	0.160	0.0200	0.0112	0.139	-	0.179
HCB	µg/kg	0.471	0.1138	24.2	13	0.481	0.0680	0.0394	0.403	-	0.539
PCB28	µg/kg	0.571	0.1813	31.7	12	0.591	0.1150	0.0654	0.457	-	0.685
PCB52	µg/kg	1.97	0.524	26.6	14	2.00	0.274	0.175	1.67	-	2.27
PCB101	µg/kg	4.97	1.450	29.2	15	5.18	0.770	0.468	4.17	-	5.77
PCB105	µg/kg	0.454	0.1518	33.4	7	0.430	0.0990	0.0717	0.319	-	0.590
PCB118	µg/kg	3.17	0.899	28.3	13	3.30	0.510	0.312	2.63	-	3.71
PCB153	µg/kg	11.0	2.59	23.7	15	10.9	2.35	0.84	9.53	-	12.4
PCB156	µg/kg	0.346	0.1301	37.6	6	0.338	0.0815	0.0664	0.216	-	0.476
PCB180	µg/kg	2.57	0.720	28.0	13	2.80	0.360	0.250	2.14	-	3.00
PCB31	µg/kg	-	-	-	5	0.360	0.1	-	-	-	-
PCB138	µg/kg	5.48	1.811	33.0	13	5.31	1.240	0.628	4.40	-	6.57

Method: Lipids - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Total-Lipid	%	3.29	0.270	8.2	8	3.33	0.157	0.119	3.07	-	3.51

Consensus Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Phenanthrene	µg/kg	9.04	2.004	22.2	20	9.08	1.221	0.560	8.10 - 9.97
Benzo[a]anthracene	µg/kg	1.46	0.274	18.8	17	1.48	0.145	0.083	1.32 - 1.60

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	-	-	-	4	3.17	0.3	-	-	-	-
Benzo[e]pyrene	µg/kg	1.56	0.219	14.1	9	1.59	0.110	0.091	1.39	-	1.72
Indeno[1,2,3-cd]pyrene	µg/kg	0.484	0.1546	32.0	13	0.520	0.1090	0.0536	0.391	-	0.576
Pyrene	µg/kg	2.45	0.645	26.3	19	2.53	0.379	0.185	2.14	-	2.76
Benzo[g,h,i]perylene	µg/kg	0.685	0.2524	36.9	17	0.738	0.1587	0.0765	0.556	-	0.814
Fluoranthene	µg/kg	5.78	1.758	30.4	23	6.08	1.206	0.458	5.02	-	6.54
Benzo[b]fluoranthene	µg/kg	1.19	0.270	22.7	16	1.23	0.173	0.084	1.04	-	1.33
Benzo[a]pyrene	µg/kg	0.443	0.1499	33.9	15	0.500	0.0911	0.0484	0.360	-	0.525
Dibenz[ah]anthracene	µg/kg	0.119	0.0296	25.0	10	0.122	0.0124	0.0117	0.0978	-	0.140
Benzo[k]fluoranthene	µg/kg	0.545	0.1855	34.1	14	0.586	0.1183	0.0620	0.438	-	0.651
Anthracene	µg/kg	0.495	0.3963	80.1	14	0.624	0.3515	0.1324	0.268	-	0.722
Fluorene	µg/kg	0.898	0.5277	58.8	14	0.975	0.3200	0.1763	0.595	-	1.20
Dibenzothiophene	µg/kg	-	-	-	4	0.298	0.1	-	-	-	-
Perylene	µg/kg	-	-	-	5	1.66	0.4	-	-	-	-
Chrysene	µg/kg	2.10	0.486	23.2	16	2.00	0.304	0.152	1.84	-	2.36
Acenaphthene	µg/kg	0.359	0.3579	99.6	13	0.444	0.2640	0.1241	0.145	-	0.574
1-methylnaphtalene	µg/kg	-	-	-	5	0.500	0.4	-	-	-	-
2-methylnaphtalene	µg/kg	-	-	-	5	0.880	0.4	-	-	-	-

Method: Lipids - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Total-Lipid	%	3.43	0.479	14.0	7	3.40	0.180	0.226	3.00	-	3.86

Indicative Values BT8

Method: Organometals - BT8

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Tributyltin (TBT)	µg Sn/kg	-	-	-	4	0.309	0.1	-	-	-	-