QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Biota

REFERENCE MATERIAL

Biota sample 379

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Biota 379

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, the 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 8 results and a maximum relative uncertainty of 6.25%. Indicative Values are based on a maximum relative uncertainty of 35% and a minimum of 4 and maximum of 7 results, or a relative uncertainty greater than 6.25% when there are at least 8 results.

For each determinand the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median, MAD (Median of Absolute Deviation), the uncertainty of the mean (consensus or indicative) value and the relative uncertainty.

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 379 of Mussel spiked 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
2024.2	BT1	QTM146BT
2024.2	BT10	QPF037BT
2024.2	BT2	QOR161BT
2024.1	BT4	QPH114BT
2024.1	BT8	QSP090BT

Consensus Values BT1

Method: Metals - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mercury	µg/kg	21.1	2.10	10.0	31	21.4	0.900	0.472	2.23
Copper	µg/kg	1433	122	8.5	24	1446	75.0	31.2	2.18
Cadmium	µg/kg	102	10.5	10.3	27	104	6.35	2.54	2.49
Lead	µg/kg	145	13.1	9.1	22	145	10.3	3.50	2.41
Cobalt	µg/kg	124	17.2	13.9	10	125	9.66	6.82	5.51
Iron	mg/kg	45.8	8.55	18.7	17	44.5	4.34	2.59	5.67
Manganese	µg/kg	3067	415	13.5	16	3033	226	130	4.23
Selenium	µg/kg	637	79.7	12.5	15	651	56.0	25.7	4.03
Arsenic	mg/kg	1.50	0.132	8.8	22	1.49	0.071	0.035	2.34
Chromium	µg/kg	138	21.4	15.4	21	142	13.3	5.83	4.21
Nickel	µg/kg	393	34.6	8.8	22	392	24.0	9.22	2.35
Zinc	mg/kg	24.6	2.49	10.1	25	24.6	1.50	0.624	2.54
Vanadium	µg/kg	170	10.1	6.0	8	170	3.60	4.48	2.64

Method: Weight - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Dry-weight	%	20.9	0.379	1.8	18	20.9	0.215	0.112	0.534

Indicative Values BT1

Method: Metals - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Aluminium	mg/kg	29.0	5.50	18.9	13	29.0	3.20	1.91	6.56
Silver	µg/kg	8.19	1.26	15.4	6	8.23	0.484	0.644	7.87
Tin	µg/kg	47.0	14.4	30.6	5	49.8	7.56	8.04	17.1
Sodium	mg/kg	5070	322	6.4	5	5100	187	180	3.56
Magnesium	mg/kg	415	11.5	2.8	5	416	6.80	6.40	1.54
Phosphorus	mg/kg	1925	179	9.3	4	1925	146	112	5.80
Potassium	mg/kg	1328	20.1	1.5	5	1330	6.93	11.3	0.848
Calcium	mg/kg	451	67.2	14.9	5	440	56.5	37.5	8.32
Molybdene	µg/kg	108	18.0	16.6	7	114	8.00	8.52	7.86
Barium	µg/kg	505	56.4	11.2	6	503	22.5	28.8	5.70
Uranium	µg/kg	24.3	0.306	1.3	6	24.2	0.200	0.156	0.644

Method: Lipids - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total-Lipid	%	2.11	0.381	18.0	7	2.10	0.190	0.180	8.52

Consensus Values BT2

Method: Chlorinated organics - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB52	µg/kg	0.634	0.128	20.2	17	0.630	0.108	0.039	6.13
PCB101	µg/kg	0.869	0.170	19.5	17	0.840	0.110	0.051	5.92
PCB118	µg/kg	0.656	0.109	16.7	16	0.662	0.063	0.034	5.21
PCB153	µg/kg	3.88	0.475	12.3	17	3.77	0.270	0.144	3.72
PCB180	µg/kg	0.544	0.085	15.6	16	0.554	0.038	0.026	4.86
PCB138	µg/kg	3.36	0.421	12.6	16	3.30	0.225	0.132	3.92

Method: Lipids - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total-Lipid	%	2.10	0.159	7.6	9	2.08	0.100	0.066	3.16

Indicative Values BT2

Method: Chlorinated organics - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
a-HCH	µg/kg	0.033	0.002	7.1	4	0.032	0.001	0.001	4.45
Dieldrin	µg/kg	1.14	0.087	7.7	5	1.14	0.050	0.049	4.30
pp'-DDE	µg/kg	0.882	0.192	21.8	13	0.921	0.126	0.067	7.54
pp'-DDD	µg/kg	0.835	0.214	25.6	13	0.892	0.085	0.074	8.88
HCB	µg/kg	1.17	0.529	45.2	15	1.21	0.362	0.171	14.6
b-HCH	µg/kg	0.132	0.043	32.5	7	0.142	0.029	0.020	15.3
PCB105	µg/kg	0.248	0.052	21.0	8	0.250	0.028	0.023	9.27
PCB31	µg/kg	0.357	0.079	22.2	8	0.369	0.050	0.035	9.80
PCB187	(µg/kg)	0.171	0.035	20.3	5	0.174	0.021	0.019	11.4
PCB99	(µg/kg)	0.122	0.017	13.8	4	0.126	0.009	0.011	8.65

Method: Lipids - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Extractable-Lipid	%	2.19	0.024	1.1	5	2.19	0.014	0.014	0.623

Consensus Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Indeno[1,2,3-cd]pyrene	µg/kg	3.34	0.545	16.3	13	3.33	0.364	0.189	5.66
Benzo[g,h,i]perylene	µg/kg	0.954	0.165	17.3	12	0.944	0.101	0.059	6.24
Naphthalene	µg/kg	14.5	0.559	3.8	8	14.5	0.355	0.247	1.70
Anthracene	µg/kg	6.27	0.973	15.5	13	6.47	0.593	0.337	5.39
Acenaphthene	µg/kg	17.9	2.43	13.6	9	17.8	1.27	1.01	5.66

Method: Lipids - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total-Lipid	%	1.97	0.162	8.2	8	1.99	0.110	0.072	3.63

Indicative Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Chrysene + Triphenylene	µg/kg	1.53	0.525	34.3	5	1.48	0.305	0.294	19.2
Benzo[e]pyrene	µg/kg	1.78	0.484	27.2	6	1.89	0.339	0.247	13.9
Phenanthrene	µg/kg	7.09	1.56	22.1	13	7.30	1.02	0.542	7.65
Pyrene	µg/kg	2.23	0.517	23.2	12	2.29	0.276	0.186	8.38
Fluoranthene	µg/kg	5.60	1.16	20.8	14	5.60	0.700	0.389	6.95
Benzo[a]anthracene	µg/kg	1.37	0.259	18.9	14	1.44	0.136	0.087	6.33
Benzo[b]fluoranthene	µg/kg	1.33	0.403	30.3	12	1.26	0.219	0.145	10.9
Benzo[a]pyrene	µg/kg	0.634	0.193	30.5	12	0.645	0.134	0.070	11.0
Dibenz[ah]anthracene	µg/kg	0.382	0.094	24.5	10	0.382	0.057	0.037	9.68
Benzo[k]fluoranthene	µg/kg	0.713	0.195	27.3	11	0.742	0.128	0.073	10.3
Fluorene	µg/kg	0.756	0.252	33.4	7	0.751	0.147	0.119	15.8
Acenaphthylene	µg/kg	11.7	2.98	25.5	9	11.9	1.31	1.24	10.6
2-methylphenanthrene	µg/kg	0.773	0.256	33.1	4	0.755	0.115	0.160	20.7
Perylene	µg/kg	1.44	0.729	50.7	4	1.44	0.330	0.456	31.7
Chrysene	µg/kg	1.28	0.412	32.2	12	1.30	0.230	0.149	11.6

Indicative Values BT8

Method: Organometals - BT8

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Tributyltin (TBT)	µg Sn/kg	4.22	0.739	17.5	8	4.34	0.393	0.326	7.73
Dibutyltin (DBT)	µg Sn/kg	1.69	0.290	17.2	6	1.65	0.196	0.148	8.75
Monobutyltin (MBT)	µg Sn/kg	2.66	0.994	37.4	5	3.00	0.460	0.556	20.9
Triphenyltin (TPhT)	µg Sn/kg	0.951	0.194	20.4	5	0.950	0.140	0.108	11.4

Consensus Values BT10

Method: Perfluorinated alkyl substances - BT10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PFOA	µg/kg	1.39	0.240	17.3	16	1.40	0.140	0.075	5.39
PFNA	µg/kg	3.32	0.538	16.2	16	3.36	0.347	0.168	5.07
PFDA	µg/kg	2.88	0.534	18.6	15	2.83	0.301	0.172	5.99
PFUnDA	µg/kg	1.58	0.282	17.8	15	1.60	0.170	0.091	5.74
PFDoA	µg/kg	2.13	0.351	16.5	14	2.16	0.210	0.117	5.51
total-PFOS	µg/kg	11.1	1.41	12.6	15	11.3	0.700	0.454	4.08

Indicative Values BT10

Method: Perfluorinated alkyl substances - BT10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
n-PFOS	µg/kg	10.2	1.84	18.1	13	9.98	0.680	0.637	6.27
PFOSA	µg/kg	5.17	1.51	29.3	10	4.96	0.732	0.597	11.6
PFBA	µg/kg	0.298	0.049	16.3	5	0.290	0.036	0.027	9.11
PFPeA	µg/kg	1.28	0.236	18.4	12	1.29	0.130	0.085	6.64
PFHxA	µg/kg	0.861	0.173	20.0	13	0.880	0.091	0.060	6.95
PFTrDA	µg/kg	0.556	0.302	54.3	12	0.637	0.238	0.109	19.6
PFTeDA	µg/kg	0.944	0.241	25.5	14	0.917	0.150	0.081	8.53
n-PFBS	µg/kg	1.22	0.252	20.6	10	1.22	0.154	0.100	8.16
n-PFHps	µg/kg	1.89	0.446	23.6	8	1.89	0.311	0.197	10.4
total-PFBS	µg/kg	0.990	0.210	21.2	5	1.01	0.110	0.117	11.8
total-PFHpS	µg/kg	1.81	0.638	35.2	6	1.75	0.323	0.325	18.0