



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Biota

REFERENCE MATERIAL

Biota sample 374



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, 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 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
2022.2	BT10	QPF029BT
2025.1	BT2	QOR162BT
2023.1	BT2	QOR155BT
2022.2	BT4	QPH108BT
2022.2	BT8	QSP084BT



Consensus Values BT1

Method: Metals - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mercury	µg/kg	25.0	2.28	9.1	25	25.1	1.78	0.571	2.28
Copper	µg/kg	2790	178	6.4	23	2809	111	46.4	1.66
Cadmium	µg/kg	98.1	7.59	7.7	22	97.5	3.65	2.02	2.06
Lead	µg/kg	166	16.6	10.0	22	166	10.0	4.43	2.68
Cobalt	µg/kg	162	15.6	9.6	12	163	9.03	5.64	3.47
Iron	mg/kg	89.7	6.39	7.1	15	90.8	3.17	2.06	2.30
Manganese	µg/kg	3916	412	10.5	16	3932	308	129	3.29
Selenium	µg/kg	675	41.4	6.1	16	670	20.0	12.9	1.92
Arsenic	mg/kg	1.78	0.110	6.2	24	1.77	0.055	0.028	1.57
Chromium	µg/kg	445	56.1	12.6	19	446	34.0	16.1	3.61
Nickel	µg/kg	482	25.4	5.3	22	483	19.0	6.78	1.41
Zinc	mg/kg	21.7	1.87	8.6	23	21.7	1.10	0.489	2.25
Silver	µg/kg	11.8	0.967	8.2	9	11.9	0.500	0.403	3.41
Vanadium	µg/kg	273	38.6	14.1	10	267	28.5	15.3	5.59

Method: Weight - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Dry-weight	%	22.2	0.341	1.5	17	22.2	0.200	0.103	0.466



Indicative Values BT1

Method: Metals - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Aluminium	mg/kg	78.3	21.8	27.8	10	74.8	16.6	8.62	11.0
Lithium	µg/kg	122	15.5	12.7	4	121	7.50	9.68	7.96
Tin	µg/kg	48.6	7.96	16.4	5	47.8	5.83	4.45	9.15
Sodium	mg/kg	5296	280	5.3	5	5220	180	157	2.96
Magnesium	mg/kg	420	58.6	13.9	7	425	35.0	27.7	6.58
Potassium	mg/kg	1564	176	11.3	5	1589	111	98.4	6.29
Calcium	mg/kg	659	147	22.4	5	710	93.4	82.4	12.5
Molybdene	µg/kg	190	18.6	9.7	7	190	9.43	8.77	4.61
Antimony	µg/kg	3.97	0.718	18.1	5	4.20	0.470	0.401	10.1
Barium	µg/kg	928	26.2	2.8	4	922	14.0	16.4	1.77
Thallium	µg/kg	1.81	0.099	5.4	4	1.84	0.053	0.062	3.40
Uranium	µg/kg	21.3	0.986	4.6	5	21.4	0.500	0.551	2.58

Method: Lipids - BT1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total-Lipid	%	3.37	1.14	33.9	5	3.80	0.725	0.639	19.0



Consensus Values BT2

Method: Chlorinated organics - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pp'-DDE	µg/kg	1.83	0.394	21.5	23	1.80	0.170	0.103	5.59
HCB	µg/kg	0.483	0.112	23.1	22	0.474	0.059	0.030	6.16
PCB52	µg/kg	1.96	0.445	22.7	29	2.00	0.260	0.103	5.26
PCB101	µg/kg	5.18	1.10	21.3	30	5.35	0.705	0.252	4.86
PCB118	µg/kg	3.41	0.592	17.3	27	3.38	0.410	0.142	4.17
PCB153	µg/kg	11.8	1.94	16.5	30	11.5	1.21	0.443	3.76
PCB180	µg/kg	2.92	0.475	16.3	28	2.92	0.280	0.112	3.85
PCB31	µg/kg	0.384	0.043	11.1	12	0.380	0.021	0.015	4.02
PCB170	(µg/kg)	1.06	0.131	12.4	9	1.04	0.110	0.055	5.18

Method: Lipids - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total-Lipid	%	3.21	0.269	8.4	14	3.22	0.185	0.090	2.80



Indicative Values BT2

Method: Chlorinated organics - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Dieldrin	µg/kg	0.247	0.073	29.5	8	0.240	0.046	0.032	13.0
pp'-DDD	µg/kg	0.188	0.064	33.9	18	0.188	0.050	0.019	9.99
PCB28	µg/kg	0.608	0.168	27.7	24	0.624	0.100	0.043	7.06
PCB105	µg/kg	0.528	0.117	22.1	15	0.529	0.062	0.038	7.13
PCB156	µg/kg	0.388	0.104	26.9	14	0.383	0.073	0.035	9.00
PCB138	µg/kg	5.85	1.63	27.8	28	5.89	0.860	0.384	6.56
PCB194	(µg/kg)	0.201	0.047	23.7	5	0.217	0.029	0.027	13.2
PCB187	(µg/kg)	2.62	0.488	18.7	9	2.65	0.350	0.203	7.77
PCB128	(µg/kg)	0.658	0.128	19.5	6	0.650	0.080	0.065	9.96
PCB99	(µg/kg)	2.94	0.536	18.2	4	2.97	0.328	0.335	11.4
PCB110	(µg/kg)	2.11	0.381	18.1	8	2.04	0.215	0.168	8.00

Method: Lipids - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Extractable-Lipid	%	3.71	0.461	12.4	4	3.66	0.235	0.288	7.76



Consensus Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Benzo[e]pyrene	µg/kg	1.56	0.219	14.1	9	1.59	0.110	0.091	5.87
Phenanthrene	µg/kg	9.04	2.00	22.2	20	9.08	1.22	0.560	6.20
Benzo[a]anthracene	µg/kg	1.46	0.273	18.8	17	1.48	0.145	0.083	5.69



Indicative Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Chrysene + Triphenylene	µg/kg	3.04	0.282	9.3	4	3.06	0.130	0.176	5.79
Indeno[1,2,3-cd]pyrene	µg/kg	0.484	0.154	31.9	13	0.520	0.109	0.054	11.1
Pyrene	µg/kg	2.45	0.642	26.2	19	2.53	0.379	0.184	7.53
Benzo[g,h,i]perylene	µg/kg	0.685	0.251	36.7	17	0.738	0.159	0.076	11.1
Fluoranthene	µg/kg	5.78	1.75	30.3	23	6.08	1.21	0.456	7.89
Benzo[b]fluoranthene	µg/kg	1.19	0.269	22.7	16	1.23	0.173	0.084	7.09
Benzo[a]pyrene	µg/kg	0.443	0.149	33.8	15	0.500	0.091	0.048	10.9
Naphthalene	µg/kg	3.46	5.61	162.1	10	3.84	3.14	2.22	64.1
Dibenz[ah]anthracene	µg/kg	0.119	0.029	24.8	10	0.122	0.012	0.012	9.81
Benzo[k]fluoranthene	µg/kg	0.544	0.185	34.0	14	0.586	0.118	0.062	11.4
Anthracene	µg/kg	0.495	0.396	80.0	14	0.624	0.352	0.132	26.7
Fluorene	µg/kg	0.897	0.527	58.7	14	0.975	0.320	0.176	19.6
Acenaphthylene	µg/kg	0.260	0.277	106.8	9	0.299	0.181	0.116	44.5
Dibenzothiophene	µg/kg	0.281	0.044	15.6	4	0.279	0.020	0.027	9.74
Perylene	µg/kg	1.66	0.503	30.3	5	1.80	0.300	0.281	16.9
Chrysene	µg/kg	2.10	0.485	23.1	16	2.00	0.304	0.152	7.23
Acenaphthene	µg/kg	0.359	0.357	99.5	13	0.444	0.264	0.124	34.5

Method: Lipids - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total-Lipid	%	3.43	0.479	14.0	7	3.40	0.180	0.226	6.60



Indicative Values BT8

Method: Organometals - BT8

Element

Tributyltin (TBT)

Unit
µg Sn/kg

Mean
0.278

Std.Dev.
0.033

CV %
11.8

N
4

Median
0.274

MAD
0.016

Uncertainty
0.020

Rel.Uncert. %
7.37



Indicative Values BT10

Method: Perfluorinated alkyl substances - BT10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
n-PFOS	µg/kg	0.190	0.082	43.3	9	0.216	0.056	0.034	18.0
PFOSA	µg/kg	0.156	0.137	87.9	8	0.207	0.100	0.061	38.8
PFOA	µg/kg	0.020	0.007	32.6	5	0.022	0.004	0.004	18.2
PFNA	µg/kg	0.022	0.009	40.2	5	0.025	0.005	0.005	22.5
PFDA	µg/kg	0.052	0.005	9.3	6	0.053	0.002	0.002	4.74
PFUnDA	µg/kg	0.050	0.031	61.8	6	0.059	0.014	0.016	31.5
PFDoA	µg/kg	0.081	0.049	60.1	6	0.078	0.024	0.025	30.7
PFTTrDA	µg/kg	0.073	0.045	61.9	7	0.077	0.026	0.021	29.2
total-PFOS	µg/kg	0.198	0.064	32.2	9	0.204	0.044	0.027	13.4