



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Biota

REFERENCE MATERIAL

Biota sample 357



Certificate of Analysis Biota 357

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 357 of Mussels spiked with contaminants from Kattegat, 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
2021.1	BT10	QPF023BT
2019.1	BT10	QPF015BT
2018.1	BT10	QPF010BT
2019.1	BT4	QPH093BT
2021.2	BT8	QSP080BT
2018.1	BT8	QSP065BT
2025.1	BT9	QBC083BT
2021.1	BT9	QBC068BT
2019.1	BT9	QBC060BT
2018.1	BT9	QBC054BT



Consensus Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Phenanthrene	µg/kg	7.59	0.922	12.1	17	7.52	0.536	0.279	3.68
Benzo[g,h,i]perylene	µg/kg	3.00	0.457	15.3	17	3.02	0.250	0.139	4.63
Fluoranthene	µg/kg	8.21	1.64	20.0	19	8.35	0.960	0.470	5.72
Benzo[a]anthracene	µg/kg	3.95	0.747	18.9	18	3.93	0.440	0.220	5.57
Benzo[a]pyrene	µg/kg	1.51	0.336	22.2	20	1.56	0.245	0.094	6.20
Dibenz[ah]anthracene	µg/kg	1.09	0.172	15.7	12	1.08	0.100	0.062	5.68

Method: Lipids - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total-Lipid	%	2.36	0.239	10.2	9	2.30	0.170	0.100	4.23



Indicative Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Chrysene + Triphenylene	µg/kg	5.22	0.426	8.2	7	5.45	0.498	0.201	3.86
Benzo[e]pyrene	µg/kg	4.36	0.784	18.0	7	4.38	0.469	0.371	8.49
Indeno[1,2,3-cd]pyrene	µg/kg	1.57	0.511	32.6	17	1.68	0.307	0.155	9.88
Pyrene	µg/kg	5.48	1.10	20.1	16	5.51	0.706	0.345	6.28
Benzo[b]fluoranthene	µg/kg	3.94	1.58	40.1	16	4.03	1.33	0.493	12.5
Naphthalene	µg/kg	3.27	0.800	24.4	10	3.33	0.525	0.316	9.66
Benzo[k]fluoranthene	µg/kg	1.61	0.401	24.9	13	1.74	0.180	0.139	8.62
Anthracene	µg/kg	0.983	0.338	34.4	18	0.990	0.220	0.100	10.1
Fluorene	µg/kg	1.70	0.348	20.5	12	1.68	0.230	0.126	7.38
Acenaphthylene	µg/kg	5.76	1.44	24.9	10	5.84	0.656	0.568	9.85
3-6-dimethylphenanthrene	µg/kg	0.280	0.088	31.5	4	0.305	0.047	0.055	19.7
2-methylphenanthrene	µg/kg	0.970	0.289	29.8	4	0.985	0.180	0.181	18.6
Chrysene	µg/kg	3.65	0.796	21.8	15	3.70	0.480	0.257	7.03
Acenaphthene	µg/kg	3.11	0.810	26.0	12	3.00	0.360	0.292	9.39



Indicative Values BT8

Method: Organometals - BT8

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Tributyltin (TBT)	µg Sn/kg	5.89	1.71	29.1	20	6.02	0.955	0.479	8.13
Dibutyltin (DBT)	µg Sn/kg	2.42	0.695	28.7	17	2.30	0.530	0.211	8.71
Monobutyltin (MBT)	µg Sn/kg	2.24	1.18	52.8	14	2.32	0.710	0.395	17.6
Triphenyltin (TPhT)	µg Sn/kg	0.445	0.276	62.0	7	0.580	0.150	0.130	29.3



Consensus Values BT9

Method: Brominated Flame Retardants - BT9

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
BDE28	µg/kg	0.316	0.082	26.0	49	0.315	0.046	0.015	4.65
BDE47	µg/kg	4.02	0.613	15.2	53	4.08	0.424	0.105	2.61
BDE99	µg/kg	0.475	0.081	17.1	50	0.470	0.053	0.014	3.03
BDE100	µg/kg	0.796	0.130	16.4	51	0.781	0.079	0.023	2.86
BDE153	µg/kg	1.11	0.217	19.6	54	1.11	0.143	0.037	3.33
BDE154	µg/kg	0.788	0.135	17.1	52	0.795	0.098	0.023	2.97
BDE183	µg/kg	0.140	0.032	23.3	39	0.141	0.021	0.007	4.65
BDE66	µg/kg	0.234	0.041	17.4	31	0.232	0.023	0.009	3.91
BDE85	µg/kg	1.62	0.325	20.0	31	1.68	0.180	0.073	4.49



Indicative Values BT9

Method: Brominated Flame Retardants - BT9

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
BDE209	µg/kg	0.107	0.107	99.8	11	0.097	0.064	0.040	37.6
TBBP-A	µg/kg	0.111	0.051	45.9	4	0.106	0.026	0.032	28.7
α-HBCD	µg/kg	0.013	0.002	13.2	4	0.013	0.001	0.001	8.24
Total lipid	(%)	2.42	0.412	17.0	8	2.33	0.210	0.182	7.52



Consensus Values BT10

Method: Perfluorinated alkyl substances - BT10
Element
PFOSA

Unit
µg/kg

Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2.61	0.496	19.0	15	2.70	0.220	0.160	6.13



Indicative Values BT10

Method: Perfluorinated alkyl substances - BT10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
n-PFOS	µg/kg	1.80	0.438	24.4	20	1.79	0.208	0.122	6.81
PFBA	µg/kg	0.356	0.161	45.2	7	0.413	0.075	0.076	21.4
PFHxA	µg/kg	0.092	0.035	38.6	15	0.105	0.026	0.011	12.5
PFHpA	µg/kg	0.071	0.031	43.5	12	0.069	0.021	0.011	15.7
PFOA	µg/kg	0.125	0.063	50.4	16	0.131	0.041	0.020	15.8
PFNA	µg/kg	0.314	0.079	25.3	18	0.326	0.071	0.023	7.45
PFDA	µg/kg	0.651	0.189	29.1	20	0.670	0.114	0.053	8.14
PFUnDA	µg/kg	0.507	0.153	30.1	19	0.518	0.108	0.044	8.64
PFDoA	µg/kg	0.377	0.098	25.9	18	0.380	0.066	0.029	7.63
PFTTrDA	µg/kg	0.429	0.227	52.8	12	0.557	0.143	0.082	19.1
PFTeDA	µg/kg	0.210	0.100	47.6	12	0.225	0.054	0.036	17.2
n-PFBS	µg/kg	0.222	0.067	30.4	17	0.222	0.040	0.020	9.23
n-PFHxS	µg/kg	0.336	0.099	29.5	19	0.349	0.066	0.028	8.46
total-PFOS	µg/kg	2.20	0.543	24.7	18	2.05	0.255	0.160	7.27