QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Biota

REFERENCE MATERIAL

Biota sample 363

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Biota 363

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 363 of Mussel tissue from Limfjord, 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
2024.1	BT10	QPF034BT
2021.2	BT10	QPF024BT
2019.2	BT10	QPF017BT
2022.2	BT2	QOR152BT
2019.2	BT2	QOR141BT
2025.1	BT4	QPH117BT
2019.2	BT4	QPH096BT
2019.2	BT8	QSP072BT
2022.1	BT9	QBC072BT

Consensus Values BT2

Method: Chlorinated organics - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pp'-DDE	µg/kg	2.30	0.428	18.6	36	2.30	0.304	0.089	3.87
pp'-DDD	µg/kg	1.34	0.381	28.4	33	1.32	0.256	0.083	6.17
HCB	µg/kg	0.790	0.229	28.9	36	0.791	0.159	0.048	6.03
PCB28	µg/kg	1.30	0.308	23.7	42	1.35	0.155	0.059	4.58
PCB52	µg/kg	0.871	0.154	17.7	40	0.876	0.082	0.030	3.50
PCB101	µg/kg	0.683	0.180	26.4	43	0.702	0.109	0.034	5.02
PCB118	µg/kg	1.72	0.231	13.4	40	1.70	0.145	0.046	2.65
PCB153	µg/kg	3.18	0.530	16.7	42	3.15	0.314	0.102	3.21
PCB180	µg/kg	1.22	0.201	16.4	44	1.22	0.115	0.038	3.10
PCB138	µg/kg	0.973	0.165	16.9	40	0.989	0.111	0.033	3.34

Method: Lipids - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total-Lipid	%	3.23	0.343	10.6	18	3.20	0.184	0.101	3.13
Extractable-Lipid	%	3.50	0.252	7.2	10	3.44	0.110	0.099	2.84

Indicative Values BT2

Method: Chlorinated organics - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
a-HCH	µg/kg	0.043	0.034	77.5	13	0.072	0.017	0.012	26.9
Transnonachlor	µg/kg	0.037	0.007	19.5	8	0.037	0.006	0.003	8.63
Dieldrin	µg/kg	0.398	0.205	51.5	12	0.404	0.082	0.074	18.6
b-HCH	µg/kg	0.190	0.066	34.7	25	0.200	0.043	0.016	8.69
HCBD	µg/kg	0.435	0.302	69.3	9	0.491	0.161	0.126	28.9
PCB105	µg/kg	0.021	0.009	44.0	15	0.023	0.006	0.003	14.2
PCB138+PCB163	µg/kg	1.00	0.083	8.3	6	0.993	0.042	0.043	4.23
PCB156	µg/kg	0.007	0.009	131.6	8	0.010	0.006	0.004	58.2
PCB31	µg/kg	0.899	0.225	25.1	22	0.907	0.164	0.060	6.68
Heptachlor-epoxide (sum)	(µg/kg)	0.027	0.015	56.5	6	0.029	0.010	0.008	28.8
cis-chlordane	(µg/kg)	0.022	0.006	26.7	8	0.022	0.004	0.003	11.8
trans-chlordane	(µg/kg)	0.013	0.007	52.3	6	0.015	0.004	0.004	26.7

Consensus Values BT4

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Chrysene + Triphenylene	µg/kg	15.6	2.10	13.5	8	15.2	1.64	0.927	5.96
Benzo[e]pyrene	µg/kg	9.23	1.14	12.4	10	9.23	0.489	0.451	4.88
Phenanthrene	µg/kg	27.4	6.48	23.7	31	26.9	3.47	1.45	5.31
Pyrene	µg/kg	19.3	4.22	21.9	31	19.4	2.10	0.947	4.91
Benzo[g,h,i]perylene	µg/kg	4.46	0.814	18.3	32	4.50	0.525	0.180	4.04
Fluoranthene	µg/kg	28.0	5.58	19.9	33	27.3	3.49	1.21	4.33
Benzo[a]anthracene	µg/kg	10.3	2.52	24.5	34	10.6	1.34	0.540	5.26
Benzo[b]fluoranthene	µg/kg	9.11	1.59	17.4	31	9.00	0.995	0.356	3.91
Benzo[a]pyrene	µg/kg	5.02	0.851	17.0	38	5.02	0.500	0.173	3.44
Anthracene	µg/kg	3.06	0.732	23.9	30	3.03	0.411	0.167	5.46

Method: Lipids - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total-Lipid	%	3.29	0.126	3.8	13	3.28	0.036	0.044	1.33

Indicative 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	1.07	0.349	32.8	31	1.05	0.210	0.078	7.35
Naphthalene	µg/kg	4.27	1.43	33.6	20	4.39	0.923	0.401	9.39
Dibenz[ah]anthracene	µg/kg	0.799	0.218	27.3	25	0.864	0.133	0.054	6.81
Benzo[k]fluoranthene	µg/kg	1.75	0.478	27.4	28	1.82	0.235	0.113	6.47
Fluorene	µg/kg	3.77	1.43	37.8	26	3.71	0.789	0.350	9.27
Acenaphthylene	µg/kg	1.34	0.516	38.6	18	1.39	0.369	0.152	11.4
Dibenzothiophene	µg/kg	5.01	1.25	25.0	9	5.27	0.680	0.521	10.4
3-6-dimethylphenanthrene	µg/kg	5.97	1.13	19.0	6	5.90	0.893	0.579	9.69
2-methylphenanthrene	µg/kg	1.25	0.261	20.9	7	1.43	0.394	0.124	9.89
Perylene	µg/kg	0.973	0.179	18.4	6	0.964	0.085	0.091	9.40
Triphenylene	µg/kg	11.1	1.89	17.1	4	11.2	1.09	1.18	10.7
Chrysene	µg/kg	4.58	1.55	33.8	29	5.00	0.900	0.359	7.84
Acenaphthene	µg/kg	2.53	0.783	30.9	21	2.73	0.413	0.214	8.43
1-methylnaphtalene	µg/kg	0.478	0.141	29.5	7	0.449	0.071	0.067	13.9
2-methylnaphtalene	µg/kg	0.583	0.247	42.3	7	0.590	0.140	0.117	20.0
C2-phenanthren.+ anthracen.	µg/kg	7.54	4.34	57.5	5	7.73	2.46	2.42	32.2
C1-pyrenes+fluoranthenes	µg/kg	6.10	2.11	34.5	4	5.98	1.26	1.32	21.6
C1-chrysenes	µg/kg	0.502	0.091	18.1	5	0.480	0.050	0.051	10.1
1-methylphenanthrene	µg/kg	1.31	0.057	4.4	4	1.31	0.044	0.036	2.74

Indicative Values BT8

Method: Organometals - BT8

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Tributyltin (TBT)	µg Sn/kg	4.46	1.32	29.6	11	4.80	0.820	0.498	11.2
Dibutyltin (DBT)	µg Sn/kg	1.79	0.529	29.5	9	1.77	0.334	0.220	12.3
Monobutyltin (MBT)	µg Sn/kg	3.15	1.58	50.1	8	3.13	0.576	0.698	22.2
Triphenyltin (TPhT)	µg Sn/kg	1.23	0.150	12.2	4	1.19	0.080	0.094	7.64

Consensus Values BT9

Method: Brominated Flame Retardants - BT9

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
BDE47	µg/kg	4.93	0.563	11.4	10	4.97	0.319	0.222	4.51
BDE99	µg/kg	0.663	0.023	3.5	9	0.660	0.018	0.010	1.44
BDE100	µg/kg	0.392	0.050	12.7	9	0.400	0.032	0.021	5.29
BDE153	µg/kg	0.396	0.041	10.4	9	0.391	0.023	0.017	4.35
BDE154	µg/kg	0.397	0.050	12.5	9	0.404	0.026	0.021	5.22

Indicative Values BT9

Method: Brominated Flame Retardants - BT9

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
BDE28	µg/kg	0.476	0.082	17.2	7	0.484	0.047	0.039	8.13
BDE183	µg/kg	0.407	0.116	28.5	9	0.414	0.091	0.048	11.9
BDE66	µg/kg	0.213	0.028	13.2	7	0.209	0.011	0.013	6.22
BDE85	µg/kg	0.268	0.064	23.7	7	0.270	0.030	0.030	11.2
Total lipid	(%)	3.41	0.304	8.9	4	3.40	0.138	0.190	5.58

Consensus Values BT10

Method: Perfluorinated alkyl substances - BT10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
n-PFOS	µg/kg	2.20	0.366	16.6	25	2.27	0.220	0.091	4.16
PFOA	µg/kg	0.418	0.096	22.9	25	0.420	0.064	0.024	5.72
PFNA	µg/kg	0.409	0.073	17.9	24	0.413	0.048	0.019	4.57
PFDA	µg/kg	0.552	0.114	20.6	27	0.553	0.081	0.027	4.97
PFTeDA	µg/kg	0.830	0.157	18.9	21	0.830	0.107	0.043	5.14
total-PFOS	µg/kg	3.21	0.697	21.8	26	3.15	0.511	0.171	5.33

Indicative Values BT10

Method: Perfluorinated alkyl substances - BT10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PFOSA	µg/kg	1.32	0.374	28.2	24	1.36	0.250	0.095	7.21
PFHxA	µg/kg	0.260	0.056	21.5	18	0.257	0.030	0.016	6.34
PFHpA	µg/kg	0.184	0.053	28.8	19	0.180	0.031	0.015	8.26
PFUnDA	µg/kg	0.511	0.151	29.6	25	0.556	0.094	0.038	7.40
PFDoA	µg/kg	0.187	0.062	33.3	15	0.181	0.039	0.020	10.7
PFTrDA	µg/kg	0.285	0.143	50.0	17	0.354	0.087	0.043	15.2
n-PFBS	µg/kg	0.173	0.061	35.1	14	0.171	0.026	0.020	11.7
n-PFHxS	µg/kg	0.349	0.078	22.3	19	0.342	0.048	0.022	6.41
total-PFHxS	µg/kg	0.408	0.057	14.0	7	0.400	0.031	0.027	6.61