QUASIMEME

**Quality assurance of information
for marine environmental monitoring**

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 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 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
2022.2	BT2	QOR152BT
2022.1	BT9	QBC072BT
2021.2	BT10	QPF024BT
2019.2	BT2	QOR141BT
2019.2	BT4	QPH096BT
2019.2	BT8	QSP072BT
2019.2	BT10	QPF017BT

Method: Chlorinated organics - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PCB28	µg/kg	1.31	0.229	17.6	42	1.35	0.155	0.044	1.24	-	1.38
PCB52	µg/kg	0.865	0.1175	13.6	40	0.876	0.0819	0.0232	0.827	-	0.902
PCB101	µg/kg	0.685	0.1564	22.8	43	0.702	0.1090	0.0298	0.637	-	0.734
PCB118	µg/kg	1.72	0.209	12.2	40	1.70	0.145	0.041	1.65	-	1.78
PCB138	µg/kg	0.975	0.1549	15.9	40	0.989	0.1105	0.0306	0.925	-	1.02
PCB153	µg/kg	3.18	0.452	14.2	42	3.15	0.314	0.087	3.04	-	3.32
PCB180	µg/kg	1.22	0.168	13.8	44	1.22	0.115	0.032	1.17	-	1.27
HCB	µg/kg	0.790	0.2294	29.0	36	0.791	0.1588	0.0478	0.712	-	0.867
pp'-DDD	µg/kg	1.34	0.364	27.1	33	1.32	0.256	0.079	1.21	-	1.47
pp'-DDE	µg/kg	2.30	0.425	18.4	36	2.30	0.304	0.088	2.16	-	2.45

Method: Lipids - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Total-Lipid	%	3.25	0.264	8.1	18	3.20	0.184	0.078	3.12	-	3.38
Extractable-Lipid	%	3.48	0.170	4.9	10	3.44	0.110	0.067	3.36	-	3.60

Method: Chlorinated organics - BT2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
PCB31	µg/kg	0.899	0.2281	25.4	22	0.907	0.1635	0.0608	0.798 -	1.000
PCB105	µg/kg	0.0208	0.0078	37.7	15	0.0233	0.0063	0.0025	0.0165 -	0.0251
PCB138+PCB163	µg/kg	1.00	0.063	6.3	6	0.993	0.042	0.032	0.938 -	1.06
a-HCH	µg/kg	0.0390	0.0249	63.7	13	0.0720	0.0170	0.0086	0.0241 -	0.0539
b-HCH	µg/kg	0.189	0.0624	33.0	25	0.200	0.0430	0.0156	0.163 -	0.215
HCBD	µg/kg	0.426	0.2510	59.0	9	0.491	0.1610	0.1046	0.236 -	0.615
Dieldrin	µg/kg	0.399	0.1321	33.1	12	0.404	0.0820	0.0477	0.316 -	0.482
Transnonachlor	µg/kg	0.0366	0.0081	22.1	8	0.0371	0.0060	0.0036	0.0300 -	0.0432
Heptachlor-epoxide (sum)	(µg/kg)	0.0267	0.0128	48.2	6	0.0286	0.0096	0.0066	0.0138 -	0.0395
cis-chlordane	(µg/kg)	0.0222	0.0059	26.7	8	0.0223	0.0043	0.0026	0.0174 -	0.0270
trans-chlordane	(µg/kg)	0.0132	0.0049	37.3	6	0.0145	0.0036	0.0025	0.0083 -	0.0181

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Acenaphthene	µg/kg	2.78	0.356	12.8	12	2.77	0.265	0.129	2.55	-	3.00
Benzo[a]pyrene	µg/kg	4.95	0.785	15.9	21	4.90	0.550	0.214	4.59	-	5.30
Benzo[b]fluoranthene	µg/kg	9.19	1.277	13.9	18	9.05	0.943	0.376	8.56	-	9.82
Benzo[g,h,i]perylene	µg/kg	4.51	0.674	14.9	17	4.50	0.520	0.204	4.17	-	4.86
Benzo[k]fluoranthene	µg/kg	1.71	0.342	20.0	16	1.77	0.230	0.107	1.53	-	1.89

Method: Polycyclic aromatic hydrocarbons - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Acenaphthylene	µg/kg	1.62	0.429	26.5	9	1.60	0.290	0.179	1.30	-	1.94
Anthracene	µg/kg	3.10	0.716	23.1	16	3.07	0.490	0.224	2.72	-	3.48
Benzo[a]anthracene	µg/kg	10.2	2.30	22.6	18	10.8	1.67	0.68	9.02	-	11.3
Benzo[e]pyrene	µg/kg	8.99	0.686	7.6	4	8.99	0.445	0.429	8.04	-	9.95
Chrysene	µg/kg	4.46	1.372	30.7	16	5.05	1.040	0.429	3.74	-	5.19
Dibenz[ah]anthracene	µg/kg	0.820	0.1881	22.9	13	0.870	0.1270	0.0652	0.708	-	0.933
Dibenzothiophene	µg/kg	5.33	0.940	17.6	4	5.59	0.655	0.588	4.03	-	6.64
Fluoranthene	µg/kg	27.6	6.27	22.7	18	27.3	4.25	1.85	24.5	-	30.7
Fluorene	µg/kg	3.67	2.067	56.3	15	3.57	1.430	0.667	2.54	-	4.81
Indeno[1,2,3-cd]pyrene	µg/kg	1.10	0.354	32.1	17	1.20	0.260	0.107	0.922	-	1.28
Naphthalene	µg/kg	4.76	1.167	24.5	12	4.90	0.779	0.421	4.03	-	5.50
Phenanthrene	µg/kg	28.8	6.19	21.5	17	28.0	4.29	1.88	25.6	-	31.9
Pyrene	µg/kg	19.3	4.23	21.9	17	18.3	2.98	1.28	17.1	-	21.5

Method: Lipids - BT4

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Total-Lipid	%	3.27	0.403	12.3	6	3.30	0.252	0.206	2.87	-	3.68

Method: Organometals - BT8

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Monobutyltin (MBT)	µg Sn/kg	3.13	0.919	29.4	8	3.13	0.576	0.406	2.38	-	3.88
Dibutyltin (DBT)	µg Sn/kg	1.81	0.481	26.5	9	1.77	0.334	0.200	1.45	-	2.17
Tributyltin (TBT)	µg Sn/kg	4.39	1.082	24.6	11	4.80	0.820	0.408	3.67	-	5.11
Triphenyltin (TPhT)	µg Sn/kg	1.23	0.104	8.5	4	1.19	0.080	0.065	1.08	-	1.37

Method: Brominated Flame Retardants - BT9

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
BDE47	µg/kg	4.93	0.473	9.6	10	4.97	0.319	0.187	4.59	-	5.26

Indicative Values   BT9

Method: Brominated Flame Retardants - BT9

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
BDE28	µg/kg	0.474	0.0695	14.7	7	0.484	0.0470	0.0328	0.412	- 0.536
BDE66	µg/kg	0.217	0.0154	7.1	7	0.209	0.0110	0.0073	0.203	- 0.230
BDE85	µg/kg	0.270	0.0452	16.7	7	0.270	0.0300	0.0213	0.229	- 0.310
BDE99	µg/kg	0.663	0.0242	3.6	9	0.660	0.0180	0.0101	0.645	- 0.681
BDE100	µg/kg	0.392	0.0504	12.9	9	0.400	0.0320	0.0210	0.354	- 0.430
BDE153	µg/kg	0.400	0.0312	7.8	9	0.391	0.0230	0.0130	0.376	- 0.423
BDE154	µg/kg	0.402	0.0394	9.8	9	0.404	0.0260	0.0164	0.372	- 0.431
BDE183	µg/kg	0.407	0.1222	30.0	9	0.414	0.0910	0.0509	0.315	- 0.499
Total lipid	(%)	3.35	0.197	5.9	4	3.40	0.138	0.123	3.07	- 3.62

Method: Perfluorinated alkyl substances - BT10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
n-PFOS	µg/kg	2.10	0.429	20.4	17	2.14	0.310	0.130	1.88	-	2.32
PFNA	µg/kg	0.390	0.0661	16.9	14	0.386	0.0425	0.0221	0.352	-	0.428
PFDA	µg/kg	0.535	0.1129	21.1	18	0.540	0.0770	0.0333	0.479	-	0.591
PFTeDA	µg/kg	0.841	0.1450	17.2	14	0.848	0.1025	0.0484	0.758	-	0.924
n-PFBS	µg/kg	0.151	0.0126	8.4	10	0.155	0.0095	0.0050	0.142	-	0.160

Method: Perfluorinated alkyl substances - BT10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
total-PFOS	µg/kg	2.96	0.699	23.6	16	2.88	0.494	0.218	2.59	-	3.33
PFOSA	µg/kg	1.35	0.427	31.6	17	1.40	0.300	0.129	1.13	-	1.57
PFHxA	µg/kg	0.249	0.0540	21.7	9	0.250	0.0350	0.0225	0.208	-	0.289
PFHpA	µg/kg	0.190	0.0644	33.8	10	0.183	0.0405	0.0254	0.145	-	0.236
PFOA	µg/kg	0.363	0.0722	19.9	14	0.369	0.0465	0.0241	0.321	-	0.404
PFUnDA	µg/kg	0.481	0.1440	30.0	16	0.502	0.0960	0.0450	0.405	-	0.557
PFDoA	µg/kg	0.189	0.0625	33.1	10	0.182	0.0420	0.0247	0.145	-	0.233
PFTrDA	µg/kg	0.287	0.1230	42.9	12	0.356	0.0845	0.0444	0.209	-	0.364
n-PFHxS	µg/kg	0.341	0.0714	20.9	15	0.341	0.0490	0.0230	0.302	-	0.381