QUASIMEME

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

Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 24

WAGENINGEN
UNIVERSITY & RESEARCH

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 dried sediment.

Sample information

QUASIMEME reference materials cover a range of natural Marine sediment species from contaminated waters from the North Sea and/or Mediterranean.   There is no spiking, mixing or other alterations of the samples. For sample preparation the sediment samples are dried at 40 oC and milled to pass a 0.5 mm sieve.

This Sediment sample 24 of estuarine sediment from Tagus river estuary, Portugal 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	MS7	QBC075MS
2021.2	MS7	QBC068MS
2020.1	MS7	QBC062MS
2019.1	MS2	QOR139MS
2017.2	MS6	QSP062MS
2017.2	MS7	QBC052MS
2016.2	MS7	QBC048MS
2016.1	MS3	QPH089MS
2015.2	MS6	QSP054MS
2015.1	MS3	QPH085MS
2014.2	MS2	QOR121MS
2014.1	MS2	QOR118MS
2014.1	MS3	QPH081MS
2014.1	MS6	QSP048MS
2014.1	MS7	QBC038MS

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
HCB	µg/kg	0.734	0.2481	33.8	48	0.754	0.1770	0.0448	0.662	-	0.806
PCB31	µg/kg	79.1	16.89	21.4	67	76.4	12.02	2.58	74.9	-	83.2
PCB52	µg/kg	481	111.4	23.1	67	478	74.0	17.0	454	-	508
PCB101	µg/kg	281	53.0	18.8	67	282	33.8	8.1	268	-	294
PCB105	µg/kg	42.8	7.16	16.7	43	42.9	4.10	1.36	40.6	-	45.0
PCB118	µg/kg	120	20.6	17.1	66	119	12.2	3.2	115	-	125
PCB153	µg/kg	66.7	10.93	16.4	68	67.7	7.77	1.66	64.1	-	69.4
PCB156	µg/kg	3.38	0.799	23.6	42	3.37	0.540	0.154	3.13	-	3.63
PCB180	µg/kg	9.42	1.965	20.9	69	9.55	1.160	0.296	8.95	-	9.89
PCB138	µg/kg	65.2	11.34	17.4	64	64.7	7.54	1.77	62.3	-	68.0

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.74	0.205	11.8	31	1.76	0.160	0.046	1.67	-	1.82

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
a-HCH	µg/kg	0.0252	0.0299	118.4	18	0.0365	0.0205	0.0088	0.0104 -	0.0400
g-HCH	µg/kg	0.0403	0.0383	95.1	24	0.0545	0.0281	0.0098	0.0241 -	0.0564
Dieldrin	µg/kg	0.495	0.1746	35.3	25	0.554	0.0940	0.0436	0.423 -	0.566
pp'-DDE	µg/kg	1.27	0.575	45.4	42	1.40	0.355	0.111	1.09 -	1.45
pp'-DDT	µg/kg	0.625	0.3793	60.7	41	0.630	0.2300	0.0740	0.506 -	0.745
pp'-DDD	µg/kg	1.20	0.424	35.3	44	1.25	0.275	0.080	1.07 -	1.33
op'-DDT	µg/kg	0.179	0.1539	86.2	24	0.201	0.1010	0.0393	0.114 -	0.243
HCBD	µg/kg	-	-	-	4	0.100	0.1	-	- -	-
PCB138+PCB163	µg/kg	81.8	27.14	33.2	10	79.8	19.69	10.73	62.6 -	101
d-HCH	µg/kg	-	-	-	5	0.100	0.1	-	- -	-

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Chrysene + Triphenylene	µg/kg	46.0	8.44	18.3	33	46.1	7.19	1.84	43.0	-	49.0
Benzo[e]pyrene	µg/kg	34.0	7.80	22.9	48	34.2	5.50	1.41	31.8	-	36.3
Indeno[1,2,3-cd]pyrene	µg/kg	34.6	9.81	28.3	82	34.3	6.10	1.35	32.5	-	36.8
Phenanthrene	µg/kg	51.3	10.46	20.4	82	52.0	6.40	1.44	49.0	-	53.6
Pyrene	µg/kg	74.1	14.66	19.8	82	76.0	9.45	2.02	70.8	-	77.3
Benzo[g,h,i]perylene	µg/kg	34.9	7.78	22.3	84	34.9	4.65	1.06	33.2	-	36.6
Fluoranthene	µg/kg	87.8	18.38	20.9	85	88.4	11.46	2.49	83.9	-	91.8
Benzo[a]anthracene	µg/kg	37.6	9.46	25.2	83	38.9	6.08	1.30	35.5	-	39.6
Benzo[b]fluoranthene	µg/kg	49.4	14.27	28.9	80	51.5	10.09	1.99	46.2	-	52.6
Benzo[a]pyrene	µg/kg	38.4	11.75	30.6	84	39.2	7.29	1.60	35.9	-	41.0
Dibenz[a,h]anthracene	µg/kg	7.51	3.077	41.0	75	8.00	1.950	0.444	6.80	-	8.22
Benzo[k]fluoranthene	µg/kg	24.1	6.83	28.4	77	24.0	4.19	0.97	22.6	-	25.7
Anthracene	µg/kg	8.10	2.511	31.0	83	8.02	1.480	0.345	7.55	-	8.65
Fluorene	µg/kg	6.48	2.312	35.7	69	6.90	1.700	0.348	5.93	-	7.04
2-methylphenanthrene	µg/kg	12.0	2.33	19.4	22	12.3	1.57	0.62	11.0	-	13.0
Chrysene	µg/kg	41.4	10.45	25.2	62	41.2	6.79	1.66	38.8	-	44.1

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.70	0.314	18.5	36	1.72	0.182	0.065	1.59	-	1.81

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Naphthalene	µg/kg	9.96	4.365	43.8	62	10.27	3.013	0.693	8.85	-	11.1
Acenaphthene	µg/kg	6.08	2.551	41.9	68	6.11	1.630	0.387	5.46	-	6.70
Acenaphthylene	µg/kg	2.32	1.601	68.9	54	2.59	1.100	0.272	1.89	-	2.76
Benzo[a]fluorene	µg/kg	9.71	4.663	48.0	7	8.87	3.090	2.203	5.55	-	13.9
Dibenzothiophene	µg/kg	3.85	1.749	45.4	32	4.07	1.045	0.386	3.22	-	4.48
3-6-dimethylphenanthrene	µg/kg	2.65	1.011	38.2	19	2.88	0.690	0.290	2.16	-	3.13
1-methylpyrene	µg/kg	8.81	3.029	34.4	8	9.85	1.850	1.339	6.34	-	11.3
Perylene	µg/kg	46.5	17.96	38.6	40	47.8	11.51	3.55	40.8	-	52.2
Triphenylene	µg/kg	10.4	3.58	34.3	12	12.0	3.03	1.29	8.19	-	12.7
C1-phenanthr.+anthrac.	µg/kg	42.7	11.09	26.0	20	42.2	6.70	3.10	37.5	-	47.9
C2-phenanthr.+anthrac.	µg/kg	43.2	14.33	33.2	21	42.8	10.30	3.91	36.7	-	49.7
C3-phenanthr.+anthrac.	µg/kg	31.6	13.31	42.1	13	34.1	8.69	4.61	23.7	-	39.6
C1-pyrenes+fluoranthenes	µg/kg	44.2	13.91	31.4	14	43.8	11.27	4.65	36.3	-	52.2
C2-pyrenes+fluoranthenes	µg/kg	28.3	2.32	8.2	8	28.7	1.24	1.02	26.4	-	30.2
C1-chrysenes	µg/kg	34.0	7.41	21.8	15	33.9	3.65	2.39	29.9	-	38.1
C2-chrysenes	µg/kg	23.2	15.57	67.1	10	22.0	8.75	6.16	12.2	-	34.2
C1-benzofluoranthenes	µg/kg	46.8	11.67	24.9	6	48.0	7.82	5.96	35.1	-	58.5

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Dibutyltin (DBT)	µg Sn/kg	48.1	16.79	34.9	64	48.6	10.72	2.62	43.9	-	52.3

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Tributyltin (TBT)	µg Sn/kg	58.6	27.57	47.1	66	60.7	18.81	4.24	51.8	-	65.3
Monobutyltin (MBT)	µg Sn/kg	109	48.9	44.8	54	115	28.0	8.3	95.9	-	123
Triphenyltin (TPhT)	µg Sn/kg	1.86	1.756	94.5	35	2.71	1.413	0.371	1.26	-	2.46
Diphenyltin (DPhT)	µg Sn/kg	2.76	2.247	81.3	21	3.55	1.893	0.613	1.74	-	3.78
Monophenyltin (MPhT)	µg Sn/kg	4.43	2.276	51.4	19	4.46	1.060	0.653	3.34	-	5.52

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
BDE047	µg/kg	0.438	0.0750	17.1	51	0.442	0.0400	0.0131	0.417 -	0.459
BDE099	µg/kg	0.483	0.0828	17.1	50	0.496	0.0565	0.0146	0.459 -	0.506
BDE100	µg/kg	0.0971	0.0205	21.1	47	0.100	0.0121	0.0037	0.0911 -	0.103
BDE153	µg/kg	0.0567	0.0132	23.2	32	0.0604	0.0070	0.0029	0.0520 -	0.0615
BDE209	µg/kg	16.5	4.23	25.6	37	16.2	2.10	0.87	15.1 -	18.0

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
BDE028	µg/kg	0.0132	0.0064	48.7	19	0.0150	0.0050	0.0018	0.0101 -	0.0163
BDE154	µg/kg	0.0441	0.0169	38.2	32	0.0477	0.0083	0.0037	0.0380 -	0.0501
BDE183	µg/kg	0.0388	0.0302	77.9	24	0.0571	0.0191	0.0077	0.0260 -	0.0515
total HBCD	µg/kg	-	-	-	5	1.90	0.2	-	- -	-
a-HBCD	µg/kg	-	-	-	5	0.574	0.1	-	- -	-
b-HBCD	µg/kg	-	-	-	4	0.197	0.0	-	- -	-
g-HBCD	µg/kg	-	-	-	5	1.03	0.3	-	- -	-
BDE66	µg/kg	0.0174	0.0050	28.6	22	0.0189	0.0028	0.0013	0.0152 -	0.0196
BDE85	µg/kg	0.0173	0.0092	53.0	23	0.0237	0.0063	0.0024	0.0133 -	0.0213