QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 24

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Sediment 24

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
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

Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PCB31	µg/kg	79.1	17.23	21.8	67	76.4	12.02	2.63	74.9 - 83.3
PCB52	µg/kg	481	108.1	22.4	67	478	74.0	16.5	455 - 508
PCB101	µg/kg	281	49.1	17.5	67	282	33.8	7.5	269 - 293
PCB105	µg/kg	43.0	5.99	13.9	43	42.9	4.10	1.14	41.1 - 44.8
PCB118	µg/kg	120	18.3	15.3	66	119	12.2	2.8	115 - 124
PCB138	µg/kg	65.1	10.80	16.6	64	64.7	7.54	1.69	62.4 - 67.8
PCB153	µg/kg	66.8	11.20	16.8	68	67.7	7.77	1.70	64.1 - 69.5
PCB156	µg/kg	3.38	0.790	23.4	42	3.37	0.540	0.152	3.13 - 3.62
PCB180	µg/kg	9.37	1.734	18.5	69	9.55	1.160	0.261	8.95 - 9.78

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	1.75	0.225	12.9	31	1.76	0.160	0.051	1.66 - 1.83

Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PCB138+PCB163	µg/kg	82.1	28.20	34.4	10	79.8	19.69	11.15	62.2 - 102
a-HCH	µg/kg	0.0227	0.0248	109.2	18	0.0365	0.0205	0.0073	0.0104 - 0.0350
g-HCH	µg/kg	0.0397	0.0364	91.8	24	0.0545	0.0281	0.0093	0.0244 - 0.0551
HCB	µg/kg	0.733	0.2544	34.7	48	0.754	0.1770	0.0459	0.660 - 0.807
Dieldrin	µg/kg	0.495	0.1333	26.9	25	0.554	0.0940	0.0333	0.440 - 0.550
pp'-DDD	µg/kg	1.19	0.399	33.4	44	1.25	0.275	0.075	1.07 - 1.32
pp'-DDE	µg/kg	1.27	0.497	39.2	42	1.40	0.355	0.096	1.11 - 1.42
op'-DDT	µg/kg	0.169	0.1306	77.1	24	0.201	0.1010	0.0333	0.114 - 0.224
pp'-DDT	µg/kg	0.610	0.3179	52.1	41	0.630	0.2300	0.0621	0.510 - 0.710

Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Acenaphthene	µg/kg	6.03	2.406	39.9	68	6.11	1.630	0.365	5.44 - 6.61
Anthracene	µg/kg	8.04	2.186	27.2	83	8.02	1.480	0.300	7.57 - 8.52
Benzo[a]anthracene	µg/kg	37.4	8.63	23.1	83	38.9	6.08	1.18	35.5 - 39.3
Benzo[a]pyrene	µg/kg	38.4	10.74	28.0	84	39.2	7.29	1.46	36.0 - 40.7
Benzo[b]fluoranthene	µg/kg	49.4	14.35	29.0	80	51.5	10.09	2.01	46.3 - 52.6
Benzo[e]pyrene	µg/kg	34.0	7.89	23.2	48	34.2	5.50	1.42	31.7 - 36.3
Benzo[g,h,i]perylene	µg/kg	35.0	6.86	19.6	84	34.9	4.65	0.94	33.5 - 36.4
Benzo[k]fluoranthene	µg/kg	23.9	6.20	25.9	77	24.0	4.19	0.88	22.5 - 25.3
Chrysene + Triphenylene	µg/kg	46.0	9.78	21.3	33	46.1	7.19	2.13	42.5 - 49.4
Chrysene	µg/kg	41.4	10.02	24.2	62	41.2	6.79	1.59	38.8 - 43.9
Dibenz[a,h]anthracene	µg/kg	7.49	2.792	37.3	75	8.00	1.950	0.403	6.84 - 8.13
Fluoranthene	µg/kg	87.7	16.81	19.2	85	88.4	11.46	2.28	84.0 - 91.3
Fluorene	µg/kg	6.50	2.411	37.1	69	6.90	1.700	0.363	5.92 - 7.08
Indeno[1,2,3-cd]pyrene	µg/kg	34.5	9.28	26.9	82	34.3	6.10	1.28	32.5 - 36.6
Phenanthrene	µg/kg	51.1	9.45	18.5	82	52.0	6.40	1.30	49.0 - 53.1
Pyrene	µg/kg	74.0	13.79	18.6	82	76.0	9.45	1.90	71.0 - 77.0
2-methylphenanthrene	µg/kg	12.0	2.27	18.9	22	12.3	1.57	0.60	11.0 - 13.0
C1-chrysenes	µg/kg	34.2	5.51	16.1	15	33.9	3.65	1.78	31.2 - 37.2

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	1.69	0.274	16.2	36	1.72	0.182	0.057	1.60 - 1.79

Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Acenaphthylene	µg/kg	2.31	1.562	67.6	54	2.59	1.100	0.266	1.89 - 2.74
Benzo[a]fluorene	µg/kg	9.65	4.479	46.4	7	8.87	3.090	2.116	5.64 - 13.7
Dibenzothiophene	µg/kg	3.81	1.522	40.0	32	4.07	1.045	0.336	3.26 - 4.36
Naphthalene	µg/kg	9.94	4.263	42.9	62	10.27	3.013	0.677	8.86 - 11.0
Perylene	µg/kg	46.1	16.56	35.9	40	47.8	11.51	3.27	40.8 - 51.4
Triphenylene	µg/kg	10.5	4.03	38.5	12	12.0	3.03	1.46	7.94 - 13.0
1-methylpyrene	µg/kg	8.84	2.475	28.0	8	9.85	1.850	1.094	6.82 - 10.9
3-6-dimethylphenanthrene	µg/kg	2.65	0.975	36.8	19	2.88	0.690	0.280	2.18 - 3.12
C1-phenanthr.+anthrac.	µg/kg	42.4	10.00	23.6	20	42.2	6.70	2.80	37.7 - 47.0
C2-phenanthr.+anthrac.	µg/kg	43.9	15.50	35.3	21	42.8	10.30	4.23	36.9 - 51.0
C3-phenanthr.+anthrac.	µg/kg	30.8	11.32	36.7	13	34.1	8.69	3.92	24.1 - 37.6
C1-pyrenes+fluoranthenes	µg/kg	45.0	15.73	35.0	14	43.8	11.27	5.26	36.0 - 54.0
C2-pyrenes+fluoranthenes	µg/kg	28.2	1.56	5.5	8	28.7	1.24	0.69	27.0 - 29.5
C2-chrysenes	µg/kg	21.7	13.33	61.3	10	22.0	8.75	5.27	12.3 - 31.1
C1-benzofluoranthenes	µg/kg	46.9	11.26	24.0	6	48.0	7.82	5.74	35.7 - 58.2

Consensus Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Dibutyltin (DBT)	µg Sn/kg	48.0	15.63	32.6	64	48.6	10.72	2.44	44.1 - 51.9

Indicative Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Tributyltin (TBT)	µg Sn/kg	58.4	26.88	46.0	66	60.7	18.81	4.14	51.8 - 65.0
Monobutyltin (MBT)	µg Sn/kg	108	42.7	39.3	54	115	28.0	7.3	96.8 - 120
Triphenyltin (TPhT)	µg Sn/kg	1.86	1.773	95.1	35	2.71	1.413	0.375	1.26 - 2.47
Diphenyltin (DPhT)	µg Sn/kg	2.77	2.527	91.2	21	3.55	1.893	0.689	1.63 - 3.92
Monophenyltin (MPhT)	µg Sn/kg	4.14	1.527	36.9	19	4.46	1.060	0.438	3.41 - 4.87

Consensus Values MS7

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
BDE047	µg/kg	0.434	0.0784	18.1	54	0.442	0.0546	0.0133	0.413 - 0.455
BDE099	µg/kg	0.487	0.0832	17.1	53	0.495	0.0550	0.0143	0.464 - 0.510
BDE100	µg/kg	0.0963	0.0201	20.8	50	0.1000	0.0140	0.0035	0.0906 - 0.102
BDE153	µg/kg	0.0566	0.0139	24.5	37	0.0600	0.0100	0.0029	0.0520 - 0.0612
BDE209	µg/kg	16.6	4.09	24.6	36	16.4	2.78	0.85	15.2 - 18.0

Indicative Values MS7

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
BDE028	µg/kg	0.0137	0.0069	50.2	22	0.0150	0.0050	0.0018	0.0106 - 0.0167
BDE154	µg/kg	0.0419	0.0134	32.0	37	0.0460	0.0090	0.0028	0.0375 - 0.0464
BDE183	µg/kg	0.0342	0.0229	66.9	27	0.0552	0.0159	0.0055	0.0251 - 0.0432
BDE66	µg/kg	0.0178	0.0045	25.4	24	0.0195	0.0034	0.0012	0.0159 - 0.0197
BDE85	µg/kg	0.0168	0.0083	49.2	22	0.0242	0.0058	0.0022	0.0131 - 0.0204
a-HBCD	µg/kg	0.606	0.1034	17.1	6	0.598	0.0690	0.0528	0.503 - 0.709
b-HBCD	µg/kg	0.167	0.0170	10.2	5	0.170	0.0120	0.0095	0.147 - 0.187
g-HBCD	µg/kg	1.11	0.299	26.9	6	1.14	0.185	0.153	0.811 - 1.41
total HBCD	µg/kg	1.94	0.255	13.2	6	1.97	0.180	0.130	1.68 - 2.19