QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 67

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Sediment 67

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.

Please note: Most WEPAL-QUASIMEME reference materials are found to be stable over the long term (>10 years) for most determinand/matrix combinations. There are a few exceptions known to us as being less stable over the long term. These are organotins in sediment (MS6), ASP in shellfish (BT7), some PAHs and PCBs in sediment (SETOC) and N-NH_4 (as N) in clay soils (ISE).

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 67 of Harbor sediment from Vigo, Spain 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	MS2	QOR155MS
2023.1	MS3	QPH118MS
2023.2	MS6	QSP088MS
2023.1	MS7	QBC076MS

Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB52	µg/kg	1.94	0.365	18.8	19	1.98	0.250	0.105	5.39
PCB101	µg/kg	5.05	0.794	15.7	19	5.09	0.362	0.228	4.51
PCB118	µg/kg	2.42	0.358	14.8	19	2.45	0.182	0.103	4.24
PCB153	µg/kg	13.9	1.81	13.1	19	14.1	0.800	0.520	3.74
PCB180	µg/kg	11.9	1.45	12.2	19	12.0	0.801	0.416	3.51
PCB194	µg/kg	2.64	0.351	13.3	10	2.67	0.229	0.139	5.26

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	1.57	0.175	11.2	9	1.55	0.112	0.073	4.65

Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
a-HCH	µg/kg	0.033	0.016	47.2	5	0.035	0.009	0.009	26.4
g-HCH	µg/kg	0.057	0.023	41.1	7	0.070	0.022	0.011	19.4
Dieldrin	µg/kg	0.316	0.157	49.5	5	0.331	0.091	0.088	27.7
pp'-DDE	µg/kg	1.47	0.320	21.7	15	1.48	0.200	0.103	7.02
pp'-DDT	µg/kg	1.60	0.522	32.6	11	1.50	0.280	0.197	12.3
pp'-DDD	µg/kg	1.57	0.342	21.7	14	1.55	0.255	0.114	7.27
HCB	µg/kg	0.107	0.041	38.0	11	0.106	0.032	0.015	14.3
op'-DDT	µg/kg	0.148	0.076	50.9	5	0.155	0.044	0.042	28.5
PCB28	µg/kg	0.494	0.130	26.3	17	0.530	0.090	0.039	7.98
PCB31	µg/kg	0.472	0.147	31.1	10	0.479	0.067	0.058	12.3
PCB105	µg/kg	0.792	0.217	27.5	12	0.776	0.157	0.078	9.91
PCB138+PCB163	µg/kg	12.4	3.82	30.8	7	13.0	2.17	1.80	14.6
PCB156	µg/kg	0.688	0.215	31.3	12	0.683	0.164	0.078	11.3
PCB138	µg/kg	8.85	1.72	19.5	15	8.95	1.09	0.556	6.29
PCB18	µg/kg	0.339	0.197	58.3	7	0.355	0.148	0.093	27.5
PCB44	µg/kg	0.829	0.227	27.3	7	0.810	0.138	0.107	12.9
PCB47	µg/kg	0.440	0.060	13.7	6	0.450	0.031	0.031	6.97
PCB49	µg/kg	1.19	0.195	16.3	7	1.18	0.081	0.092	7.71
PCB66	µg/kg	1.12	0.218	19.4	6	1.17	0.123	0.111	9.90
PCB110	µg/kg	3.04	0.346	11.4	6	3.06	0.214	0.176	5.80
PCB128	µg/kg	1.10	0.329	30.0	9	1.13	0.146	0.137	12.5
PCB149	µg/kg	10.9	1.74	16.0	7	11.0	0.896	0.824	7.54
PCB170	µg/kg	5.47	1.10	20.1	10	5.53	0.683	0.434	7.94
PCB183	µg/kg	2.68	0.647	24.1	8	2.66	0.356	0.286	10.7
PCB187	µg/kg	7.39	0.763	10.3	6	7.47	0.287	0.389	5.27
PCB158	µg/kg	1.04	0.314	30.3	7	0.968	0.192	0.148	14.3
PCB141	µg/kg	2.25	0.475	21.1	7	2.37	0.318	0.224	9.98
PCB151	µg/kg	3.68	0.237	6.4	7	3.70	0.133	0.112	3.03

Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Indeno[1,2,3-cd]pyrene	µg/kg	132	26.3	19.9	23	132	11.8	6.86	5.19
Phenanthrene	µg/kg	143	30.2	21.1	22	142	19.4	8.05	5.63
Pyrene	µg/kg	214	47.9	22.4	22	214	27.4	12.8	5.97
Benzo[g,h,i]perylene	µg/kg	127	21.2	16.8	23	127	14.7	5.54	4.37
Fluoranthene	µg/kg	255	50.6	19.9	21	268	33.6	13.8	5.42
Benzo[a]pyrene	µg/kg	136	24.3	17.9	23	137	15.6	6.32	4.65
Anthracene	µg/kg	25.7	4.84	18.9	23	24.9	3.14	1.26	4.92

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	1.55	0.121	7.8	9	1.57	0.097	0.050	3.25

Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Chrysene + Triphenylene	µg/kg	133	29.6	22.2	8	134	23.6	13.1	9.80
Benzo[e]pyrene	µg/kg	112	24.0	21.5	14	112	16.0	8.02	7.18
Benzo[a]anthracene	µg/kg	125	35.1	28.0	22	129	25.7	9.36	7.47
Benzo[b]fluoranthene	µg/kg	170	42.0	24.6	15	176	27.7	13.5	7.95
Naphthalene	µg/kg	33.6	8.84	26.3	20	35.1	5.78	2.47	7.34
Dibenz[a,h]anthracene	µg/kg	28.9	9.05	31.3	22	27.4	6.49	2.41	8.34
Benzo[k]fluoranthene	µg/kg	80.0	18.9	23.6	19	82.1	9.23	5.41	6.77
Fluorene	µg/kg	14.4	5.08	35.2	21	15.4	3.25	1.38	9.59
Acenaphthene	µg/kg	10.7	3.69	34.4	20	10.3	2.36	1.03	9.62
Acenaphthylene	µg/kg	6.96	3.47	49.9	19	7.57	2.31	0.996	14.3
Dibenzothiophene	µg/kg	13.2	3.09	23.4	9	12.9	1.05	1.29	9.77
2-methylphenanthrene	µg/kg	39.4	8.52	21.6	6	38.6	5.74	4.35	11.0
Perylene	µg/kg	44.6	10.3	23.0	11	44.4	8.17	3.86	8.66
Triphenylene	µg/kg	22.6	3.14	13.9	4	23.5	1.67	1.96	8.69
Chrysene	µg/kg	121	31.3	25.9	17	125	23.8	9.50	7.86
Benzofluoranthenes (b+j)	µg/kg	262	30.3	11.6	5	267	18.0	17.0	6.48
C1-phenanthr.+anthrac.	µg/kg	112	23.6	21.0	5	115	14.1	13.2	11.8
C2-phenanthr.+anthrac.	µg/kg	92.2	25.0	27.1	5	96.3	14.3	14.0	15.2
C1-naphtalenes	µg/kg	46.2	9.74	21.1	5	46.7	6.41	5.44	11.8
C3-napthalenes	µg/kg	48.0	30.0	62.4	6	45.1	16.7	15.3	31.8
1-methylphenanthrene	µg/kg	24.0	12.8	53.4	5	25.2	7.89	7.18	29.8
1-methylnaphtalene	µg/kg	17.7	3.26	18.5	7	19.2	2.80	1.54	8.73
2-methylnaphtalene	µg/kg	26.5	9.08	34.2	7	28.7	4.60	4.29	16.2

Method: Total petroleum hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total petroleum hydrocarbons	mg/kg	443	66.8	15.1	5	441	40.0	37.3	8.43

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PN	%	0.146	0.006	3.9	4	0.145	0.003	0.004	2.44

Indicative Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Tributyltin (TBT)	µg Sn/kg	21.6	6.80	31.5	20	22.3	5.22	1.90	8.80
Dibutyltin (DBT)	µg Sn/kg	27.0	9.30	34.5	17	27.0	6.35	2.82	10.5
Monobutyltin (MBT)	µg Sn/kg	109	54.8	50.2	13	118	30.8	19.0	17.4

Indicative Values MS7

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
BDE099	µg/kg	0.021	0.005	23.2	4	0.022	0.003	0.003	14.5
BDE183	µg/kg	0.072	0.022	29.8	6	0.075	0.008	0.011	15.2
BDE209	µg/kg	4.84	0.757	15.6	7	4.93	0.448	0.358	7.38