



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Sediment

REFERENCE MATERIAL

Sediment sample 67



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 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 % probability) 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 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
2023.2	MS6	QSP088MS
2023.1	MS2	QOR155MS
2023.1	MS3	QPH118MS
2023.1	MS7	QBC076MS



Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PCB52	µg/kg	1.94	0.366	18.9	19	1.98	0.250	0.105	1.76	-	2.12
PCB101	µg/kg	5.05	0.797	15.8	19	5.09	0.362	0.228	4.66	-	5.43
PCB118	µg/kg	2.42	0.360	14.9	19	2.45	0.182	0.103	2.25	-	2.59
PCB153	µg/kg	13.9	1.82	13.1	19	14.1	0.80	0.52	13.0	-	14.8
PCB180	µg/kg	11.9	1.46	12.3	19	12.0	0.80	0.42	11.2	-	12.6
PCB194	µg/kg	2.64	0.354	13.4	10	2.67	0.229	0.140	2.39	-	2.89



Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
a-HCH	µg/kg	-	-	-	5	0.0480	0.0	-	-	-	-
g-HCH	µg/kg	0.0569	0.0234	41.1	7	0.0696	0.0216	0.0110	0.0360	-	0.0778
Dieldrin	µg/kg	-	-	-	5	0.344	0.1	-	-	-	-
pp'-DDE	µg/kg	1.47	0.321	21.8	15	1.48	0.200	0.104	1.30	-	1.65
pp'-DDT	µg/kg	1.60	0.522	32.6	11	1.50	0.280	0.197	1.26	-	1.95
pp'-DDD	µg/kg	1.57	0.343	21.8	14	1.55	0.255	0.114	1.38	-	1.77
HCB	µg/kg	0.107	0.0406	38.0	11	0.106	0.0320	0.0153	0.0799	-	0.134
op'-DDT	µg/kg	-	-	-	5	0.345	0.2	-	-	-	-
b-HCH	µg/kg	-	-	-	5	0.0609	0.0	-	-	-	-
PCB28	µg/kg	0.494	0.1304	26.4	17	0.530	0.0900	0.0395	0.427	-	0.560
PCB31	µg/kg	0.472	0.1479	31.3	10	0.479	0.0670	0.0585	0.368	-	0.576
PCB105	µg/kg	0.792	0.2181	27.5	12	0.776	0.1570	0.0787	0.655	-	0.929
PCB138+PCB163	µg/kg	12.4	3.82	30.8	7	13.0	2.17	1.80	8.98	-	15.8
PCB156	µg/kg	0.688	0.2156	31.3	12	0.683	0.1640	0.0778	0.552	-	0.824
PCB138	µg/kg	8.85	1.729	19.5	15	8.95	1.090	0.558	7.90	-	9.80
PCB18	µg/kg	0.339	0.1972	58.2	7	0.355	0.1480	0.0931	0.162	-	0.515
PCB44	µg/kg	0.829	0.2264	27.3	7	0.810	0.1380	0.1070	0.627	-	1.03
PCB47	µg/kg	0.440	0.0601	13.6	6	0.450	0.0305	0.0307	0.380	-	0.500
PCB49	µg/kg	1.19	0.195	16.3	7	1.18	0.081	0.092	1.02	-	1.37
PCB66	µg/kg	1.12	0.218	19.4	6	1.17	0.123	0.111	0.906	-	1.34
PCB110	µg/kg	3.04	0.345	11.4	6	3.06	0.214	0.176	2.70	-	3.39
PCB128	µg/kg	1.10	0.329	30.0	9	1.13	0.146	0.137	0.848	-	1.34
PCB149	µg/kg	10.9	1.74	16.0	7	11.0	0.90	0.82	9.36	-	12.5
PCB170	µg/kg	5.47	1.106	20.2	10	5.53	0.683	0.437	4.69	-	6.25
PCB183	µg/kg	2.68	0.647	24.1	8	2.66	0.356	0.286	2.16	-	3.21
PCB187	µg/kg	7.39	0.763	10.3	6	7.47	0.287	0.389	6.63	-	8.15
PCB158	µg/kg	1.04	0.314	30.3	7	0.968	0.192	0.148	0.757	-	1.32
PCB141	µg/kg	2.25	0.475	21.1	7	2.37	0.318	0.224	1.83	-	2.67
PCB151	µg/kg	3.68	0.236	6.4	7	3.70	0.133	0.112	3.47	-	3.90

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.57	0.175	11.1	9	1.55	0.112	0.073	1.44	-	1.70



Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Indeno[1,2,3-cd]pyrene	µg/kg	132	26.5	20.0	23	132	11.8	6.9	121	-	144
Phenanthrene	µg/kg	143	30.2	21.1	22	142	19.4	8.1	130	-	156
Pyrene	µg/kg	214	47.9	22.4	22	214	27.4	12.8	192	-	235
Benzo[g,h,i]perylene	µg/kg	127	21.3	16.8	23	127	14.7	5.6	117	-	136
Fluoranthene	µg/kg	255	50.8	19.9	21	268	33.6	13.8	232	-	278
Benzo[a]pyrene	µg/kg	136	24.3	17.9	23	137	15.6	6.3	125	-	146
Anthracene	µg/kg	25.7	4.86	18.9	23	24.9	3.14	1.27	23.6	-	27.8



Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Chrysene + Triphenylene	µg/kg	133	29.6	22.2	8	134	23.6	13.1	109	-	158
Benzo[e]pyrene	µg/kg	112	24.0	21.5	14	112	16.0	8.0	97.9	-	125
Benzo[a]anthracene	µg/kg	125	35.1	28.0	22	129	25.7	9.4	110	-	141
Benzo[b]fluoranthene	µg/kg	170	42.1	24.7	15	176	27.7	13.6	147	-	193
Naphthalene	µg/kg	33.6	8.84	26.3	20	35.1	5.78	2.47	29.5	-	37.8
Dibenz[a,h]anthracene	µg/kg	28.9	9.05	31.3	22	27.4	6.49	2.41	24.9	-	32.9
Benzo[k]fluoranthene	µg/kg	80.0	18.95	23.7	19	82.1	9.23	5.43	70.9	-	89.1
Fluorene	µg/kg	14.4	5.10	35.3	21	15.4	3.25	1.39	12.1	-	16.8
Acenaphthene	µg/kg	10.7	3.69	34.4	20	10.3	2.36	1.03	9.01	-	12.5
Acenaphthylene	µg/kg	6.96	3.487	50.1	19	7.57	2.311	1.000	5.28	-	8.63
Dibenzothiophene	µg/kg	13.2	3.09	23.4	9	12.9	1.05	1.29	10.8	-	15.5
3-6-dimethylphenanthrene	µg/kg	-	-	-	4	11.3	2.7	-	-	-	-
2-methylphenanthrene	µg/kg	39.4	8.51	21.6	6	38.6	5.74	4.35	30.9	-	47.9
Perylene	µg/kg	44.6	10.25	23.0	11	44.4	8.17	3.86	37.8	-	51.4
Triphenylene	µg/kg	-	-	-	4	23.5	1.7	-	-	-	-
Chrysene	µg/kg	121	31.4	26.0	17	125	23.8	9.5	105	-	137
Benzo[fluoranthenes (b+j)	µg/kg	-	-	-	5	267	18.0	-	-	-	-
C1-phenanthr.+anthrac.	µg/kg	-	-	-	5	115	14.1	-	-	-	-
C2-phenanthr.+anthrac.	µg/kg	-	-	-	5	96.3	14.3	-	-	-	-
C1-naphthalenes	µg/kg	-	-	-	5	46.7	6.4	-	-	-	-
C3-naphthalenes	µg/kg	48.0	29.94	62.4	6	45.1	16.71	15.28	18.1	-	77.9
1-methylphenanthrene	µg/kg	-	-	-	5	25.2	7.9	-	-	-	-
1-methylnaphthalene	µg/kg	17.7	3.26	18.5	7	19.2	2.80	1.54	14.7	-	20.6
2-methylnaphthalene	µg/kg	26.5	9.08	34.2	7	28.7	4.60	4.29	18.4	-	34.6

Method: Total petroleum hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Total petroleum hydrocarbons	mg/kg	-	-	-	5	441	40.0	-	-	-	-

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.55	0.121	7.8	9	1.57	0.097	0.050	1.46	-	1.64

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PN	%	-	-	-	4	0.145	0.0	-	-	-	-



Indicative Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Tributyltin (TBT)	µg Sn/kg	21.6	6.80	31.5	20	22.3	5.22	1.90	18.4	-	24.8
Dibutyltin (DBT)	µg Sn/kg	27.0	9.33	34.6	17	27.0	6.35	2.83	22.2	-	31.8
Monobutyltin (MBT)	µg Sn/kg	109	54.9	50.3	13	118	30.8	19.0	76.3	-	142



Indicative Values MS7

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
BDE047	µg/kg	-	-	-	4	0.0500	0.0	-	-	-	-
BDE099	µg/kg	-	-	-	4	0.0500	0.0	-	-	-	-
BDE183	µg/kg	0.0723	0.0215	29.7	6	0.0751	0.0077	0.0110	0.0508	-	0.0937
BDE209	µg/kg	4.84	0.757	15.6	7	4.93	0.448	0.357	4.17	-	5.52