QUASIMEME

Quality assurance of information for marine environmental monitoring

Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 45

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 45 of Harbor sediment from Vigo harbor, 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
2022.1	MS6	QSP081MS
2021.1	MS6	QSP077MS
2020.2	MS2	QOR144MS
2018.2	MS2	QOR137MS
2018.2	MS3	QPH100MS
2018.2	MS7	QBC057MS

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PCB28	µg/kg	0.538	0.0925	17.2	21	0.550	0.0630	0.0252	0.496	-	0.580
PCB31	µg/kg	0.535	0.1357	25.3	31	0.534	0.0940	0.0305	0.486	-	0.585
PCB52	µg/kg	2.63	0.602	22.8	46	2.68	0.413	0.111	2.46	-	2.81
PCB101	µg/kg	5.62	1.199	21.3	45	5.77	0.820	0.223	5.26	-	5.98
PCB118	µg/kg	2.84	0.540	19.0	43	2.87	0.363	0.103	2.68	-	3.01
PCB138	µg/kg	9.06	2.672	29.5	41	9.16	1.838	0.522	8.22	-	9.91
PCB153	µg/kg	13.9	3.63	26.1	47	13.9	2.60	0.66	12.8	-	14.9
PCB180	µg/kg	11.6	2.54	21.9	47	11.8	1.69	0.46	10.9	-	12.4
HCB	µg/kg	0.147	0.0341	23.2	32	0.153	0.0230	0.0075	0.135	-	0.159
pp'-DDE	µg/kg	1.50	0.315	21.0	33	1.51	0.223	0.068	1.39	-	1.61
pp'-DDT	µg/kg	1.44	0.379	26.3	30	1.50	0.266	0.087	1.30	-	1.58

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.51	0.133	8.8	27	1.51	0.090	0.032	1.46	-	1.56

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
PCB18	µg/kg	0.235	0.0546	23.2	6	0.239	0.0356	0.0278	0.181 -	0.290
PCB44	µg/kg	1.32	0.060	4.6	5	1.30	0.045	0.034	1.25 -	1.39
PCB47	µg/kg	0.540	0.0883	16.3	5	0.560	0.0567	0.0493	0.439 -	0.642
PCB49	µg/kg	1.38	0.307	22.2	5	1.36	0.213	0.172	1.03 -	1.74
PCB66	µg/kg	1.30	0.071	5.5	5	1.32	0.050	0.040	1.21 -	1.38
PCB105	µg/kg	0.894	0.2975	33.3	23	0.886	0.2138	0.0775	0.766 -	1.02
PCB110	µg/kg	3.74	0.645	17.2	5	3.79	0.460	0.360	3.00 -	4.48
PCB128	µg/kg	1.05	0.275	26.3	7	1.06	0.186	0.130	0.799 -	1.29
PCB138+PCB163	µg/kg	13.1	3.06	23.4	14	13.7	2.19	1.02	11.4 -	14.9
PCB141	µg/kg	2.43	0.684	28.2	5	2.23	0.452	0.383	1.64 -	3.21
PCB149	µg/kg	10.6	1.30	12.3	7	10.7	0.83	0.62	9.42 -	11.7
PCB151	µg/kg	4.01	0.704	17.6	4	3.81	0.501	0.440	3.03 -	4.98
PCB156	µg/kg	0.695	0.2115	30.4	26	0.702	0.1505	0.0518	0.610 -	0.780
PCB158	µg/kg	0.913	0.0674	7.4	4	0.939	0.0519	0.0421	0.820 -	1.01
PCB170	µg/kg	4.91	1.805	36.7	8	4.95	1.243	0.798	3.44 -	6.38
PCB183	µg/kg	2.46	0.173	7.0	5	2.48	0.132	0.097	2.26 -	2.66
PCB187	µg/kg	7.21	0.778	10.8	6	7.42	0.570	0.397	6.44 -	7.99
PCB194	µg/kg	2.67	1.002	37.6	7	2.86	0.710	0.474	1.77 -	3.56
a-HCH	µg/kg	0.0363	0.0231	63.7	16	0.0471	0.0169	0.0072	0.0241 -	0.0486
b-HCH	µg/kg	0.0428	0.0262	61.1	14	0.0660	0.0174	0.0087	0.0278 -	0.0578
g-HCH	µg/kg	0.0653	0.0266	40.8	19	0.0724	0.0184	0.0076	0.0525 -	0.0781
Dieldrin	µg/kg	0.375	0.1609	42.9	12	0.407	0.1129	0.0581	0.274 -	0.476
pp'-DDD	µg/kg	1.46	0.427	29.2	30	1.47	0.293	0.097	1.30 -	1.62
op'-DDT	µg/kg	0.159	0.0793	49.8	21	0.171	0.0550	0.0216	0.123 -	0.195
Transnonachlor	µg/kg	0.0192	0.0061	31.8	5	0.0200	0.0044	0.0034	0.0122 -	0.0262

Method: Nitrogen - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
PN	%	0.156	0.0089	5.7	5	0.157	0.0050	0.0050	0.145 -	0.166

Consensus Values   MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Anthracene	µg/kg	27.7	6.35	22.9	25	27.2	4.51	1.59	25.1	-	30.3
Benzo[a]anthracene	µg/kg	116	18.8	16.2	25	118	12.0	4.7	108	-	124
Benzo[a]pyrene	µg/kg	133	21.2	16.0	26	138	14.8	5.2	124	-	141
Benzo[e]pyrene	µg/kg	120	13.2	11.0	16	121	8.6	4.1	113	-	127
Benzo[g,h,i]perylene	µg/kg	120	24.7	20.6	25	122	16.6	6.2	109	-	130
Benzo[k]fluoranthene	µg/kg	77.6	15.11	19.5	22	77.7	10.61	4.03	70.9	-	84.3
Chrysene	µg/kg	113	21.9	19.3	20	116	15.2	6.1	103	-	124
Dibenz[a,h]anthracene	µg/kg	26.3	5.92	22.5	23	26.8	4.08	1.54	23.7	-	28.8
Dibenzothiophene	µg/kg	13.0	1.23	9.5	12	12.9	0.85	0.44	12.2	-	13.7
Fluoranthene	µg/kg	237	52.8	22.2	26	242	37.0	12.9	216	-	258
Perylene	µg/kg	46.8	5.82	12.4	15	48.1	4.12	1.88	43.6	-	50.0
Phenanthrene	µg/kg	146	18.5	12.7	25	147	12.5	4.6	138	-	153
Pyrene	µg/kg	207	42.3	20.5	25	208	28.4	10.6	189	-	224

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.49	0.142	9.6	13	1.49	0.090	0.049	1.40	-	1.57

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Acenaphthene	µg/kg	10.8	3.28	30.4	20	11.2	2.26	0.92	9.25	-	12.3
Acenaphthylene	µg/kg	6.70	3.392	50.6	15	7.50	2.200	1.095	4.83	-	8.57
Benzo[b]fluoranthene	µg/kg	163	45.5	27.9	19	166	30.2	13.0	141	-	185
Chrysene + Triphenylene	µg/kg	135	24.1	17.8	8	132	16.6	10.6	116	-	155
Fluorene	µg/kg	15.8	4.47	28.3	21	15.9	3.10	1.22	13.8	-	17.8
Indeno[1,2,3-cd]pyrene	µg/kg	119	31.2	26.3	25	115	20.7	7.8	106	-	131
Naphthalene	µg/kg	30.5	8.98	29.4	21	31.1	6.10	2.45	26.4	-	34.6
Triphenylene	µg/kg	24.3	1.08	4.4	5	24.8	0.90	0.60	23.0	-	25.5
Benzofluoranthenes (b+j)	µg/kg	236	20.7	8.8	6	232	14.2	10.6	215	-	256
2-methylphenanthrene	µg/kg	39.4	11.54	29.3	9	39.8	7.50	4.81	30.7	-	48.1
3-6-dimethylphenanthrene	µg/kg	6.01	1.196	19.9	7	6.30	0.810	0.565	4.94	-	7.08
C1-phenanthr.+anthrac.	µg/kg	107	24.3	22.8	7	112	16.4	11.5	84.9	-	128
C2-phenanthr.+anthrac.	µg/kg	85.8	32.86	38.3	7	93.8	23.50	15.53	56.4	-	115
C3-phenanthr.+anthrac.	µg/kg	54.8	4.22	7.7	5	52.5	3.47	2.36	50.0	-	59.6
C1-pyrenes+fluoranthenes	µg/kg	122	21.1	17.3	5	128	17.5	11.8	97.5	-	146
C1-chrysenes	µg/kg	104	27.9	26.9	5	96.7	20.0	15.6	71.6	-	136
C2-chrysenes	µg/kg	84.9	32.61	38.4	4	86.2	21.85	20.38	39.6	-	130
C1-naphtalenes	µg/kg	51.7	28.91	56.0	5	54.3	19.13	16.16	18.4	-	84.9

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Tributyltin (TBT)	µg Sn/kg	24.8	7.37	29.8	38	25.2	5.07	1.49	22.3	-	27.2
Dibutyltin (DBT)	µg Sn/kg	28.6	7.57	26.5	38	28.6	5.28	1.53	26.1	-	31.1

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Monobutyltin (MBT)	µg Sn/kg	114	51.4	45.2	32	122	34.8	11.4	95.3	-	132
Triphenyltin (TPhT)	µg Sn/kg	0.482	0.3787	78.5	10	0.585	0.2660	0.1497	0.215	-	0.749

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
BDE047	µg/kg	0.0195	0.0086	44.1	7	0.0239	0.0067	0.0041	0.0118 -	0.0272
BDE099	µg/kg	0.0233	0.0018	7.8	6	0.0238	0.0011	0.0009	0.0215 -	0.0252
BDE100	µg/kg	0.0072	0.0026	36.1	4	0.0081	0.0019	0.0016	0.0036 -	0.0108
BDE153	µg/kg	0.0137	0.0084	61.5	5	0.0160	0.0060	0.0047	0.0040 -	0.0234
BDE183	µg/kg	0.0599	0.0179	29.8	8	0.0689	0.0107	0.0079	0.0454 -	0.0745
BDE209	µg/kg	5.11	2.096	41.0	9	5.23	1.526	0.873	3.53 -	6.69