



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Sediment

REFERENCE MATERIAL

Sediment sample 44



Certificate of Analysis Sediment 44

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 44 of Mix of two types of open sea sediment from Burbo Bight Liverpool/Norwegian trench 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	MS3	QPH119MS
2021.1	MS2	QOR146MS
2021.1	MS3	QPH109MS



Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
pp'-DDE	µg/kg	0.205	0.0278	13.6	12	0.208	0.0135	0.0100	0.188	-	0.223
pp'-DDD	µg/kg	0.323	0.0526	16.3	13	0.331	0.0400	0.0182	0.291	-	0.354
PCB52	µg/kg	0.624	0.1141	18.3	17	0.610	0.0800	0.0346	0.566	-	0.683

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.15	0.073	6.3	10	1.15	0.048	0.029	1.10	-	1.20



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	0.0856	0.1	-	-	-	-
g-HCH	µg/kg	-	-	-	5	0.100	0.1	-	-	-	-
Dieldrin	µg/kg	0.103	0.0589	57.2	7	0.0900	0.0327	0.0278	0.0503	-	0.156
HCB	µg/kg	0.130	0.0574	44.0	11	0.120	0.0310	0.0216	0.0923	-	0.168
PCB28	µg/kg	0.213	0.0629	29.5	16	0.220	0.0425	0.0197	0.180	-	0.247
PCB31	µg/kg	0.162	0.0647	40.0	10	0.152	0.0410	0.0256	0.116	-	0.207
PCB101	µg/kg	0.595	0.1337	22.5	19	0.619	0.0838	0.0383	0.530	-	0.659
PCB105	µg/kg	0.127	0.0617	48.6	11	0.140	0.0490	0.0233	0.0860	-	0.168
PCB118	µg/kg	0.317	0.1120	35.3	16	0.367	0.0805	0.0350	0.258	-	0.377
PCB138+PCB163	µg/kg	1.01	0.464	46.0	7	1.01	0.335	0.219	0.593	-	1.42
PCB153	µg/kg	0.675	0.2737	40.6	18	0.675	0.1795	0.0807	0.539	-	0.810
PCB156	µg/kg	0.0824	0.0559	67.9	8	0.0860	0.0420	0.0247	0.0368	-	0.128
PCB180	µg/kg	0.401	0.1921	47.9	17	0.424	0.1440	0.0582	0.303	-	0.500
PCB138	µg/kg	0.567	0.1868	32.9	15	0.549	0.0996	0.0603	0.465	-	0.670
PCB18	µg/kg	-	-	-	4	0.0846	0.0	-	-	-	-
PCB44	µg/kg	0.322	0.1263	39.2	6	0.315	0.0600	0.0645	0.196	-	0.448
PCB49	µg/kg	-	-	-	5	0.278	0.0	-	-	-	-
PCB66	µg/kg	-	-	-	4	0.338	0.1	-	-	-	-
PCB110	µg/kg	-	-	-	5	0.540	0.1	-	-	-	-
PCB149	µg/kg	0.772	0.3942	51.0	7	0.709	0.2434	0.1862	0.420	-	1.12
PCB170	µg/kg	0.323	0.1863	57.6	7	0.321	0.1360	0.0880	0.157	-	0.490
PCB183	µg/kg	-	-	-	4	0.141	0.0	-	-	-	-
PCB187	µg/kg	-	-	-	5	0.190	0.1	-	-	-	-
PCB158	µg/kg	-	-	-	4	0.127	0.0	-	-	-	-
PCB141	µg/kg	-	-	-	4	0.210	0.1	-	-	-	-
PCB151	µg/kg	-	-	-	5	0.340	0.1	-	-	-	-
PCB194	µg/kg	-	-	-	5	0.123	0.0	-	-	-	-

Method: Nitrogen - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PN	%	-	-	-	4	0.144	0.0	-	-	-	-



Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Chrysene + Triphenylene	µg/kg	33.7	6.65	19.7	16	34.3	3.44	2.08	30.2	-	37.2
Benzo[e]pyrene	µg/kg	46.7	10.49	22.5	28	46.2	7.60	2.48	42.7	-	50.8
Indeno[1,2,3-cd]pyrene	µg/kg	69.7	19.75	28.3	45	69.5	13.80	3.68	63.8	-	75.7
Pyrene	µg/kg	41.5	8.24	19.9	44	41.5	4.70	1.55	39.0	-	44.0
Benzo[g,h,i]perylene	µg/kg	61.6	15.31	24.8	45	61.0	10.87	2.85	57.0	-	66.2
Fluoranthene	µg/kg	47.9	10.11	21.1	45	47.8	5.41	1.88	44.8	-	50.9
Benzo[a]anthracene	µg/kg	23.2	5.99	25.8	44	23.9	3.47	1.13	21.4	-	25.1
Benzo[b]fluoranthene	µg/kg	70.2	20.54	29.3	36	69.5	12.61	4.28	63.2	-	77.1
Benzo[a]pyrene	µg/kg	29.3	5.13	17.5	45	29.5	2.90	0.96	27.8	-	30.9
Benzo[k]fluoranthene	µg/kg	28.5	6.74	23.7	39	29.6	5.31	1.35	26.3	-	30.7
Chrysene	µg/kg	25.1	6.11	24.3	36	24.8	4.00	1.27	23.1	-	27.2

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.16	0.102	8.8	23	1.15	0.060	0.027	1.12	-	1.21

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PN	%	0.146	0.0201	13.7	11	0.146	0.0114	0.0076	0.133	-	0.160



Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Phenanthrene	µg/kg	44.1	14.63	33.2	44	46.4	10.50	2.76	39.6	-	48.5
Naphthalene	µg/kg	17.0	6.05	35.6	38	17.4	4.19	1.23	15.0	-	19.0
Dibenz[a,h]anthracene	µg/kg	12.1	4.84	39.9	44	12.9	3.44	0.91	10.7	-	13.6
Anthracene	µg/kg	5.88	2.016	34.3	42	6.11	1.210	0.389	5.25	-	6.51
Fluorene	µg/kg	6.01	2.158	35.9	37	5.90	1.570	0.443	5.29	-	6.73
Acenaphthene	µg/kg	2.66	0.814	30.7	34	2.68	0.536	0.175	2.37	-	2.94
Acenaphthylene	µg/kg	2.71	1.192	44.1	33	2.89	0.698	0.259	2.28	-	3.13
Benzo[a]fluorene	µg/kg	-	-	-	4	8.81	1.4	-	-	-	-
Dibenzothiophene	µg/kg	5.56	1.895	34.1	19	6.16	0.902	0.543	4.65	-	6.47
3-6-dimethylphenanthrene	µg/kg	-	-	-	5	4.00	1.3	-	-	-	-
2-methylphenanthrene	µg/kg	19.8	10.69	54.0	12	19.6	8.58	3.86	13.1	-	26.5
1-methylpyrene	µg/kg	-	-	-	4	8.74	1.1	-	-	-	-
Perylene	µg/kg	13.2	4.23	32.2	24	13.2	2.38	1.08	11.4	-	14.9
Triphenylene	µg/kg	9.54	2.872	30.1	13	9.27	2.359	0.996	7.82	-	11.3
Benzo[fluoranthenes (a+b+j+k)	µg/kg	130	29.2	22.5	6	135	15.4	14.9	101	-	159
Benzo[fluoranthenes (b+j)	µg/kg	101	26.6	26.4	10	98.7	18.8	10.5	81.9	-	119
C1-phenanthr.+anthrac.	µg/kg	60.2	21.28	35.3	14	61.8	18.50	7.11	48.0	-	72.4
C2-phenanthr.+anthrac.	µg/kg	47.7	18.21	38.2	15	48.0	12.62	5.88	37.7	-	57.7
C3-phenanthr.+anthrac.	µg/kg	27.0	9.70	35.9	10	26.5	6.27	3.83	20.2	-	33.8
C1-pyrenes+fluoranthenes	µg/kg	44.8	25.06	55.9	9	35.5	14.52	10.44	25.9	-	63.7
C2-pyrenes+fluoranthenes	µg/kg	-	-	-	4	37.5	4.7	-	-	-	-
C1-chrysenes	µg/kg	35.9	13.49	37.6	8	32.1	7.12	5.96	24.9	-	46.9
C2-chrysenes	µg/kg	-	-	-	4	26.2	14.8	-	-	-	-
C1-naphtalenes	µg/kg	55.3	18.11	32.8	11	55.3	15.96	6.83	43.3	-	67.3
C2-naphtalenes	µg/kg	58.5	28.14	48.1	14	61.1	18.22	9.40	42.4	-	74.7
C3-naphtalenes	µg/kg	43.6	26.86	61.7	14	48.1	18.20	8.97	28.2	-	59.0
C1-phenanthrenes	µg/kg	-	-	-	5	84.7	9.7	-	-	-	-
C1-dibenzothiophenes	µg/kg	11.3	4.49	39.6	10	11.7	3.20	1.78	8.18	-	14.5
C2-dibenzothiophenes	µg/kg	12.7	6.08	47.8	10	13.2	4.05	2.40	8.43	-	17.0
C3-dibenzothiophenes	µg/kg	6.57	2.327	35.4	8	6.50	1.695	1.028	4.68	-	8.47
1-methylphenanthrene	µg/kg	17.8	5.46	30.8	8	17.6	3.35	2.41	13.3	-	22.2
1-methylnaphtalene	µg/kg	21.1	9.46	44.8	15	21.4	5.44	3.05	15.9	-	26.3
2-methylnaphtalene	µg/kg	29.4	12.96	44.0	14	29.6	8.37	4.33	22.0	-	36.9



Indicative Values MS3

Method: Total petroleum hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Total petroleum hydrocarbons	mg/kg	39.0	13.06	33.5	6	40.4	4.99	6.67	25.9	-	52.0