



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Sediment

REFERENCE MATERIAL

Sediment sample 42



Certificate of Analysis Sediment 42

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.

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 °C and milled to pass a 0.5 mm sieve.

This Sediment sample 42 of Open sea sediment from Station 805 Isle of Man, United Kingdom 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
2024.1	MS2	QOR158MS
2019.1	MS2	QOR138MS
2022.1	MS3	QPH113MS
2019.1	MS3	QPH101MS
2017.2	MS3	QPH096MS
2024.2	MS8	QPF027MS
2022.1	MS8	QPF017MS
2020.2	MS8	QPF009MS



Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pp'-DDE	µg/kg	0.287	0.062	21.4	30	0.300	0.039	0.014	4.89
pp'-DDD	µg/kg	0.747	0.094	12.6	28	0.745	0.053	0.022	2.99

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	0.774	0.069	8.9	23	0.780	0.040	0.018	2.33



Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
g-HCH	µg/kg	0.022	0.023	107.4	9	0.042	0.017	0.010	44.7
Dieldrin	µg/kg	0.106	0.038	35.5	11	0.122	0.021	0.014	13.4
pp'-DDT	µg/kg	0.134	0.054	40.5	27	0.134	0.031	0.013	9.73
HCB	µg/kg	0.197	0.060	30.6	25	0.206	0.031	0.015	7.66
HCBd	µg/kg	0.148	0.049	33.2	7	0.159	0.026	0.023	15.7
PCB28	µg/kg	0.229	0.080	34.8	16	0.245	0.048	0.025	10.9
PCB31	µg/kg	0.196	0.081	41.3	26	0.194	0.059	0.020	10.1
PCB52	µg/kg	0.378	0.242	64.0	38	0.411	0.176	0.049	13.0
PCB101	µg/kg	0.554	0.293	52.9	40	0.565	0.186	0.058	10.4
PCB105	µg/kg	0.131	0.085	64.7	23	0.144	0.056	0.022	16.9
PCB118	µg/kg	0.489	0.329	67.4	39	0.482	0.208	0.066	13.5
PCB138+PCB163	µg/kg	1.30	0.333	25.7	10	1.27	0.283	0.132	10.2
PCB153	µg/kg	0.958	0.414	43.2	40	0.959	0.241	0.082	8.53
PCB156	µg/kg	0.087	0.040	45.4	21	0.101	0.031	0.011	12.4
PCB180	µg/kg	0.598	0.269	45.0	40	0.637	0.165	0.053	8.90
PCB138	µg/kg	0.885	0.458	51.8	39	0.979	0.341	0.092	10.4
PCB44	µg/kg	0.119	0.048	40.1	5	0.120	0.030	0.027	22.4
PCB49	µg/kg	0.115	0.034	29.7	6	0.125	0.021	0.017	15.1
PCB66	µg/kg	0.207	0.051	24.7	5	0.218	0.018	0.029	13.8
PCB110	µg/kg	0.331	0.104	31.3	5	0.338	0.057	0.058	17.5
PCB128	µg/kg	0.159	0.107	67.4	7	0.160	0.058	0.051	31.8
PCB149	µg/kg	0.803	0.281	34.9	7	0.773	0.163	0.133	16.5
PCB170	µg/kg	0.421	0.176	41.9	9	0.447	0.097	0.073	17.4
PCB183	µg/kg	0.128	0.039	30.3	6	0.136	0.018	0.020	15.5
PCB187	µg/kg	0.347	0.103	29.8	6	0.348	0.095	0.053	15.2
PCB158	µg/kg	0.071	0.018	25.6	4	0.071	0.014	0.011	16.0
PCB151	µg/kg	0.202	0.088	43.5	5	0.196	0.050	0.049	24.3
PCB194	µg/kg	0.117	0.082	70.0	7	0.133	0.045	0.039	33.1

Method: Nitrogen - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PN	%	0.102	0.012	11.9	4	0.103	0.006	0.008	7.42



Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Chrysene + Triphenylene	µg/kg	70.0	11.6	16.6	26	72.1	6.65	2.84	4.06
Benzo[e]pyrene	µg/kg	84.3	17.8	21.1	49	83.1	10.1	3.17	3.77
Indeno[1,2,3-cd]pyrene	µg/kg	86.3	19.3	22.4	71	86.8	10.8	2.86	3.32
Phenanthrene	µg/kg	114	40.4	35.3	68	113	27.0	6.12	5.35
Pyrene	µg/kg	98.1	17.0	17.3	68	95.7	11.9	2.58	2.63
Benzo[g,h,i]perylene	µg/kg	85.1	13.7	16.1	70	84.1	7.95	2.05	2.40
Fluoranthene	µg/kg	101	15.9	15.8	71	99.4	10.9	2.36	2.34
Benzo[a]anthracene	µg/kg	54.9	10.5	19.2	66	54.8	6.18	1.62	2.96
Benzo[b]fluoranthene	µg/kg	113	28.3	25.1	56	112	18.9	4.72	4.20
Benzo[a]pyrene	µg/kg	67.7	10.3	15.3	70	67.5	6.12	1.54	2.28
Naphthalene	µg/kg	36.9	11.8	31.8	63	36.8	6.50	1.85	5.01
Dibenz[a,h]anthracene	µg/kg	17.4	4.17	24.0	65	17.3	2.50	0.646	3.72
Benzo[k]fluoranthene	µg/kg	46.8	7.76	16.6	61	47.4	4.71	1.24	2.65
Anthracene	µg/kg	11.5	3.33	28.9	67	11.7	2.10	0.509	4.41
Perylene	µg/kg	18.5	2.45	13.2	40	18.5	1.52	0.484	2.62
Chrysene	µg/kg	51.7	7.33	14.2	50	52.4	5.00	1.30	2.51

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	0.783	0.076	9.7	37	0.780	0.040	0.016	2.00

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PN	%	0.100	0.008	8.1	12	0.099	0.005	0.003	2.92



Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Fluorene	µg/kg	21.0	10.1	48.0	62	22.1	6.37	1.60	7.62
Acenaphthene	µg/kg	15.5	11.6	75.1	61	17.9	8.58	1.86	12.0
Acenaphthylene	µg/kg	4.72	2.76	58.4	48	4.67	1.67	0.498	10.5
Benzo[a]fluorene	µg/kg	17.2	10.6	61.3	6	17.0	6.17	5.39	31.3
Dibenzothiophene	µg/kg	20.5	12.6	61.7	32	21.2	9.16	2.79	13.6
3-6-dimethylphenanthrene	µg/kg	9.00	2.59	28.8	17	9.20	1.70	0.785	8.72
2-methylphenanthrene	µg/kg	54.7	15.3	27.9	21	54.7	12.3	4.17	7.61
1-methylpyrene	µg/kg	17.6	10.5	59.9	7	18.0	6.78	4.97	28.3
Triphenylene	µg/kg	22.3	5.69	25.5	15	23.0	3.58	1.84	8.23
Benzo[fluoranthenes (a+b+j+k)	µg/kg	180	31.7	17.6	8	184	16.4	14.0	7.78
Benzo[fluoranthenes (b+j)	µg/kg	165	30.3	18.4	10	161	16.5	12.0	7.26
C1-phenanthr.+anthrac.	µg/kg	154	55.0	35.8	23	154	41.2	14.3	9.32
C2-phenanthr.+anthrac.	µg/kg	105	40.5	38.5	21	101	23.7	11.0	10.5
C3-phenanthr.+anthrac.	µg/kg	64.4	20.3	31.5	15	68.3	10.3	6.54	10.2
C1-pyrenes+fluoranthenes	µg/kg	108	56.0	51.6	15	107	31.2	18.1	16.7
C2-pyrenes+fluoranthenes	µg/kg	100	39.1	39.1	8	92.1	16.5	17.3	17.3
C1-chrysenes	µg/kg	91.9	24.1	26.2	13	90.8	14.2	8.35	9.09
C2-chrysenes	µg/kg	72.5	48.8	67.3	10	71.0	37.5	19.3	26.6
C1-benzo[fluoranthenes	µg/kg	123	48.1	39.0	4	126	21.9	30.1	24.4
C1-naphtalenes	µg/kg	121	58.7	48.4	13	116	30.6	20.3	16.8
C2-naphtalenes	µg/kg	201	140	69.4	14	204	99.2	46.6	23.2
C3-naphtalenes	µg/kg	142	123	86.8	14	143	68.2	41.1	29.0
1-methylphenanthrene	µg/kg	38.5	16.9	44.0	5	39.8	10.1	9.46	24.6
1-methylnaphtalene	µg/kg	48.1	12.5	25.9	7	48.3	7.56	5.88	12.2
2-methylnaphtalene	µg/kg	76.5	31.2	40.8	7	82.4	25.7	14.8	19.3

Method: Total petroleum hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total petroleum hydrocarbons	mg/kg	41.4	12.5	30.3	4	41.6	6.66	7.83	18.9



Indicative Values MS8

Method: Perfluorinated alkyl substances - MS8

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
n-PFOS	µg/kg	0.094	0.022	22.9	16	0.098	0.013	0.007	7.16
PFOA	µg/kg	0.061	0.017	27.4	10	0.061	0.014	0.007	10.8
PFNA	µg/kg	0.015	0.002	13.5	5	0.015	0.001	0.001	7.53
PFDA	µg/kg	0.023	0.005	23.2	6	0.023	0.003	0.003	11.8
PFUnDA	µg/kg	0.025	0.014	55.2	8	0.027	0.007	0.006	24.4
total-PFOS	µg/kg	0.103	0.028	27.6	14	0.110	0.019	0.010	9.21
NEtFOSAA	µg/kg	0.020	0.011	51.6	5	0.023	0.007	0.006	28.9