QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 70

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Sediment 70

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 oC and milled to pass a 0.5 mm sieve.

This Sediment sample 70 of Mix estuary sediment from Westerscheldt\Nieuwe Maas, Netherlands 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
2024.2	MS2	QOR161MS
2024.2	MS3	QPH124MS
2024.2	MS6	QSP092MS

Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB101	µg/kg	1.59	0.283	17.8	23	1.61	0.150	0.074	4.63
PCB118	µg/kg	0.988	0.215	21.8	21	1.01	0.130	0.059	5.95
PCB153	µg/kg	2.83	0.449	15.9	23	2.92	0.271	0.117	4.13
PCB180	µg/kg	1.45	0.344	23.8	23	1.46	0.203	0.090	6.19

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	0.967	0.079	8.2	13	0.960	0.040	0.027	2.83

Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
a-HCH	µg/kg	0.041	0.054	133.0	8	0.055	0.028	0.024	58.8
g-HCH	µg/kg	0.042	0.026	60.8	9	0.053	0.017	0.011	25.3
Dieldrin	µg/kg	0.196	0.095	48.4	5	0.203	0.060	0.053	27.0
pp'-DDE	µg/kg	0.475	0.210	44.3	17	0.517	0.128	0.064	13.4
pp'-DDT	µg/kg	0.307	0.190	61.7	13	0.336	0.146	0.066	21.4
pp'-DDD	µg/kg	0.326	0.097	29.8	16	0.337	0.058	0.030	9.32
HCB	µg/kg	0.451	0.120	26.7	15	0.450	0.090	0.039	8.61
b-HCH	µg/kg	0.052	0.027	52.0	10	0.063	0.020	0.011	20.6
PCB28	µg/kg	0.910	0.254	28.0	20	0.938	0.175	0.071	7.81
PCB31	µg/kg	0.724	0.170	23.4	12	0.736	0.135	0.061	8.46
PCB52	µg/kg	1.07	0.243	22.7	20	1.09	0.125	0.068	6.34
PCB105	µg/kg	0.259	0.122	47.2	13	0.273	0.063	0.042	16.3
PCB138+PCB163	µg/kg	2.76	0.813	29.4	5	2.90	0.460	0.455	16.4
PCB156	µg/kg	0.164	0.051	31.0	12	0.167	0.032	0.018	11.2
PCB138	µg/kg	2.08	0.631	30.3	22	2.01	0.415	0.168	8.07
PCB18	µg/kg	0.456	0.126	27.6	6	0.473	0.049	0.064	14.1
PCB44	µg/kg	0.551	0.091	16.5	6	0.565	0.052	0.047	8.44
PCB47	µg/kg	0.422	0.072	16.9	5	0.441	0.034	0.040	9.47
PCB49	µg/kg	0.869	0.161	18.5	7	0.890	0.085	0.076	8.73
PCB66	µg/kg	0.868	0.093	10.7	6	0.857	0.036	0.048	5.48
PCB110	µg/kg	1.47	0.270	18.3	6	1.48	0.170	0.138	9.36
PCB128	µg/kg	0.357	0.110	30.8	8	0.353	0.045	0.049	13.6
PCB149	µg/kg	2.07	0.330	15.9	9	2.15	0.160	0.137	6.62
PCB170	µg/kg	0.747	0.189	25.3	10	0.755	0.115	0.075	10.0
PCB183	µg/kg	0.315	0.049	15.6	7	0.322	0.024	0.023	7.35
PCB187	µg/kg	0.880	0.176	20.0	7	0.902	0.138	0.083	9.45
PCB158	µg/kg	0.172	0.024	13.7	5	0.178	0.012	0.013	7.65
PCB141	µg/kg	0.347	0.085	24.4	5	0.367	0.049	0.047	13.6
PCB151	µg/kg	0.630	0.151	24.0	5	0.679	0.095	0.084	13.4
PCB194	µg/kg	0.272	0.086	31.6	9	0.278	0.056	0.036	13.2
PCB28+PCB31	µg/kg	1.71	0.152	8.9	4	1.73	0.078	0.095	5.54

Method: Nitrogen - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PN	%	0.095	0.009	9.4	4	0.094	0.004	0.006	5.88

Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Benzo[e]pyrene	µg/kg	64.0	12.3	19.2	17	64.6	7.10	3.73	5.82
Indeno[1,2,3-cd]pyrene	µg/kg	65.5	16.6	25.3	27	66.6	8.56	3.98	6.08
Phenanthrene	µg/kg	65.5	13.7	21.0	25	66.5	8.29	3.43	5.25
Pyrene	µg/kg	92.4	23.3	25.2	26	93.7	15.4	5.71	6.17
Benzo[g,h,i]perylene	µg/kg	54.8	13.8	25.1	27	57.0	7.90	3.31	6.04
Benzo[a]anthracene	µg/kg	63.9	15.7	24.6	26	62.2	7.94	3.86	6.04
Benzo[a]pyrene	µg/kg	64.9	13.6	21.0	26	64.8	8.97	3.34	5.14

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	0.995	0.087	8.8	13	0.984	0.057	0.030	3.04

Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Chrysene + Triphenylene	µg/kg	75.2	12.8	17.0	9	76.0	5.25	5.33	7.09
Fluoranthene	µg/kg	112	31.0	27.8	25	108	19.6	7.74	6.94
Benzo[b]fluoranthene	µg/kg	88.4	25.1	28.4	21	93.2	16.2	6.86	7.76
Naphthalene	µg/kg	34.6	12.2	35.4	24	36.0	7.84	3.12	9.02
Dibenz[a,h]anthracene	µg/kg	14.9	4.65	31.2	27	15.1	2.37	1.12	7.51
Benzo[k]fluoranthene	µg/kg	39.9	10.7	26.8	24	40.4	7.09	2.73	6.83
Anthracene	µg/kg	24.1	10.0	41.6	26	24.5	6.11	2.46	10.2
Fluorene	µg/kg	14.0	4.85	34.6	26	14.6	2.58	1.19	8.47
Acenaphthene	µg/kg	8.69	3.13	36.0	22	8.86	1.90	0.833	9.59
Acenaphthylene	µg/kg	7.63	5.31	69.5	19	8.50	4.04	1.52	19.9
Dibenzothiophene	µg/kg	7.88	2.28	29.0	15	7.88	1.38	0.737	9.35
3-6-dimethylphenanthrene	µg/kg	6.47	3.58	55.4	6	6.75	2.12	1.83	28.3
2-methylphenanthrene	µg/kg	19.8	8.77	44.3	11	18.4	6.16	3.31	16.7
1-methylpyrene	µg/kg	9.50	3.15	33.2	4	9.25	1.47	1.97	20.7
Perylene	µg/kg	52.8	18.5	35.0	15	54.5	11.3	5.97	11.3
Triphenylene	µg/kg	19.3	4.04	20.9	9	19.0	3.70	1.68	8.71
Chrysene	µg/kg	60.4	14.8	24.6	23	61.0	10.0	3.87	6.41
Benzofluoranthenes (a+b+j+k)	µg/kg	175	31.1	17.8	4	167	16.0	19.5	11.1
Benzofluoranthenes (b+j)	µg/kg	136	22.7	16.7	6	137	10.5	11.6	8.50
C1-phenanthr.+anthrac.	µg/kg	63.4	14.9	23.5	11	60.8	9.58	5.63	8.87
C2-phenanthr.+anthrac.	µg/kg	61.0	15.6	25.5	11	58.4	10.2	5.87	9.62
C3-phenanthr.+anthrac.	µg/kg	48.5	14.6	30.1	9	46.3	8.35	6.07	12.5
C1-pyrenes+fluoranthenes	µg/kg	110	38.2	34.8	7	106	26.2	18.1	16.5
C1-chrysenes	µg/kg	62.4	16.7	26.7	6	63.5	6.47	8.51	13.6
C1-naphtalenes	µg/kg	47.5	11.0	23.1	8	48.9	7.10	4.86	10.2
C2-naphtalenes	µg/kg	57.5	25.8	44.9	11	58.7	13.9	9.73	16.9
C3-napthalenes	µg/kg	40.3	24.1	59.8	10	42.5	17.8	9.53	23.6
C1-dibenzothiophenes	µg/kg	14.5	4.95	34.2	7	13.0	2.81	2.34	16.2
C2-dibenzothiophenes	µg/kg	28.6	11.9	41.7	7	25.3	6.43	5.64	19.7
C3-dibenzothiophenes	µg/kg	27.7	5.54	20.0	7	27.1	5.28	2.62	9.46
1-methylphenanthrene	µg/kg	11.4	5.83	51.2	6	12.4	2.95	2.97	26.1
1-methylnaphtalene	µg/kg	12.9	4.70	36.3	12	13.2	3.28	1.70	13.1
2-methylnaphtalene	µg/kg	30.8	12.0	38.9	10	33.1	6.95	4.74	15.4

Indicative Values MS3

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PN	%	0.092	0.017	18.6	5	0.090	0.010	0.010	10.4

Indicative Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Tributyltin (TBT)	µg Sn/kg	1.04	0.547	52.5	11	0.900	0.390	0.206	19.8
Dibutyltin (DBT)	µg Sn/kg	1.96	0.946	48.2	8	2.05	0.780	0.418	21.3
Monobutyltin (MBT)	µg Sn/kg	4.20	2.61	62.1	8	5.69	1.59	1.15	27.4