QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 77

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Sediment 77

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 77 of North Sea (near Sylt) from North Sea (near Sylt) 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	MS2	QOR157MS
2023.2	MS3	QPH120MS

Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PCB153	µg/kg	0.679	0.1412	20.8	21	0.678	0.0869	0.0385	0.615 - 0.743

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	1.60	0.099	6.2	11	1.63	0.055	0.037	1.53 - 1.66

Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
a-HCH	µg/kg	0.0199	0.0029	14.8	6	0.0205	0.0010	0.0015	0.0169 - 0.0228
g-HCH	µg/kg	0.0202	0.0073	36.2	6	0.0230	0.0045	0.0037	0.0129 - 0.0276
pp'-DDE	µg/kg	0.268	0.0877	32.7	15	0.267	0.0540	0.0283	0.220 - 0.316
pp'-DDD	µg/kg	0.401	0.1114	27.8	14	0.396	0.0655	0.0372	0.337 - 0.465
HCB	µg/kg	0.316	0.0742	23.5	13	0.318	0.0380	0.0257	0.271 - 0.360
b-HCH	µg/kg	-	-	-	5	0.0455	0.0	-	- - -
PCB28	µg/kg	0.115	0.0546	47.7	18	0.124	0.0275	0.0161	0.0875 - 0.142
PCB31	µg/kg	0.0821	0.0185	22.5	9	0.0850	0.0090	0.0077	0.0682 - 0.0960
PCB52	µg/kg	0.212	0.0616	29.0	20	0.199	0.0377	0.0172	0.183 - 0.241
PCB101	µg/kg	0.364	0.1157	31.8	21	0.380	0.0706	0.0316	0.311 - 0.416
PCB105	µg/kg	0.0682	0.0363	53.3	8	0.0700	0.0225	0.0160	0.0386 - 0.0978
PCB118	µg/kg	0.242	0.0661	27.3	21	0.240	0.0400	0.0180	0.212 - 0.272
PCB138+PCB163	µg/kg	0.822	0.2650	32.2	6	0.837	0.1525	0.1352	0.557 - 1.09
PCB156	µg/kg	0.0567	0.0402	71.0	8	0.0550	0.0230	0.0178	0.0239 - 0.0895
PCB180	µg/kg	0.322	0.1236	38.4	21	0.330	0.0682	0.0337	0.266 - 0.378
PCB138	µg/kg	0.550	0.1975	35.9	19	0.533	0.1200	0.0566	0.456 - 0.645
PCB18	µg/kg	-	-	-	4	0.0800	0.1	-	- - -
PCB44	µg/kg	-	-	-	4	0.0790	0.0	-	- - -
PCB47	µg/kg	-	-	-	5	0.0742	0.0	-	- - -
PCB49	µg/kg	0.120	0.0165	13.7	6	0.126	0.0121	0.0084	0.104 - 0.137
PCB66	µg/kg	0.120	0.0423	35.2	6	0.123	0.0160	0.0216	0.0780 - 0.163
PCB110	µg/kg	-	-	-	5	0.307	0.1	-	- - -
PCB128	µg/kg	0.0930	0.0272	29.2	6	0.0979	0.0175	0.0139	0.0658 - 0.120
PCB149	µg/kg	0.527	0.0865	16.4	9	0.530	0.0718	0.0360	0.461 - 0.592
PCB170	µg/kg	0.143	0.0258	18.1	9	0.149	0.0150	0.0108	0.123 - 0.162
PCB183	µg/kg	-	-	-	5	0.0760	0.0	-	- - -
PCB187	µg/kg	0.192	0.0444	23.1	7	0.189	0.0260	0.0210	0.152 - 0.231
PCB141	µg/kg	-	-	-	5	0.0770	0.0	-	- - -
PCB151	µg/kg	0.108	0.0280	25.8	6	0.106	0.0201	0.0143	0.0804 - 0.136
PCB194	µg/kg	0.0485	0.0119	24.5	7	0.0520	0.0060	0.0056	0.0379 - 0.0591

Method: Nitrogen - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PN	%	-	-	-	4	0.198	0.0	-	- - -

Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Benzo[e]pyrene	µg/kg	67.3	10.88	16.2	12	66.8	5.90	3.93	60.5 - 74.2
Pyrene	µg/kg	90.1	16.48	18.3	20	90.3	9.71	4.61	82.4 - 97.8
Benzo[a]anthracene	µg/kg	48.6	10.00	20.6	20	49.6	6.04	2.79	43.9 - 53.2
Benzo[a]pyrene	µg/kg	45.5	8.36	18.4	20	45.1	4.02	2.34	41.6 - 49.4
Fluorene	µg/kg	16.1	3.60	22.3	20	15.7	2.37	1.01	14.5 - 17.8
Chrysene	µg/kg	50.9	10.23	20.1	18	50.9	8.05	3.02	45.8 - 56.0

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	1.58	0.106	6.7	11	1.60	0.040	0.040	1.51 - 1.65

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	72.1	18.88	26.2	6	70.6	13.59	9.64	53.3 - 91.0
Indeno[1,2,3-cd]pyrene	µg/kg	70.0	19.64	28.1	20	70.6	15.88	5.49	60.8 - 79.1
Phenanthrene	µg/kg	59.8	13.99	23.4	20	61.5	9.48	3.91	53.3 - 66.3
Benzo[g,h,i]perylene	µg/kg	63.7	17.42	27.3	20	62.6	10.80	4.87	55.6 - 71.8
Fluoranthene	µg/kg	124	28.1	22.7	20	118	18.7	7.9	111 - 137
Benzo[b]fluoranthene	µg/kg	97.9	30.51	31.1	17	104.6	18.17	9.25	82.3 - 114
Naphthalene	µg/kg	44.6	13.25	29.7	20	45.9	7.40	3.70	38.4 - 50.8
Dibenz[a,h]anthracene	µg/kg	13.7	4.69	34.2	20	14.0	3.33	1.31	11.5 - 15.9
Benzo[k]fluoranthene	µg/kg	44.5	11.83	26.6	19	45.5	6.71	3.39	38.8 - 50.2
Anthracene	µg/kg	17.4	4.15	23.9	20	16.6	2.64	1.16	15.4 - 19.3
Acenaphthene	µg/kg	6.35	1.791	28.2	18	6.64	1.167	0.528	5.46 - 7.24
Acenaphthylene	µg/kg	4.99	2.161	43.3	16	5.09	1.535	0.675	3.85 - 6.14
Dibenzothiophene	µg/kg	7.92	1.342	16.9	10	7.69	0.665	0.530	6.98 - 8.87
2-methylphenanthrene	µg/kg	14.6	6.62	45.3	6	15.0	2.52	3.38	7.99 - 21.2
Perylene	µg/kg	66.1	19.11	28.9	12	66.4	11.00	6.89	54.1 - 78.1
Triphenylene	µg/kg	22.7	4.26	18.8	7	23.0	2.02	2.01	18.9 - 26.5
Benzofluoranthenes (b+j)	µg/kg	-	-	-	5	142	16.3	-	- - -
C1-phenanthr.+anthrac.	µg/kg	57.1	9.94	17.4	8	59.5	6.93	4.39	49.0 - 65.2
C2-phenanthr.+anthrac.	µg/kg	52.5	15.67	29.9	8	53.0	10.83	6.92	39.7 - 65.3
C3-phenanthr.+anthrac.	µg/kg	-	-	-	5	36.5	10.0	-	- - -
C1-pyrenes+fluoranthenes	µg/kg	-	-	-	4	65.6	11.5	-	- - -
C1-naphtalenes	µg/kg	53.2	11.59	21.8	7	56.3	9.60	5.47	42.9 - 63.6
C2-naphtalenes	µg/kg	58.2	13.43	23.1	8	60.8	6.65	5.93	47.2 - 69.1
C3-napthalenes	µg/kg	44.3	22.70	51.2	8	46.7	13.60	10.03	25.8 - 62.8
C1-dibenzothiophenes	µg/kg	9.16	2.395	26.2	6	9.23	1.435	1.222	6.77 - 11.6
C2-dibenzothiophenes	µg/kg	13.8	3.52	25.6	6	13.8	3.29	1.80	10.3 - 17.3
C3-dibenzothiophenes	µg/kg	9.66	3.282	34.0	6	9.80	2.290	1.675	6.39 - 12.9
1-methylphenanthrene	µg/kg	-	-	-	4	14.7	1.1	-	- - -
1-methylnaphtalene	µg/kg	16.9	7.47	44.1	9	17.3	4.80	3.11	11.3 - 22.6
2-methylnaphtalene	µg/kg	30.0	11.38	37.9	9	29.4	7.46	4.74	21.4 - 38.6

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PN	%	-	-	-	5	0.201	0.0	-	- - -