QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 42

WAGENINGEN
UNIVERSITY & RESEARCH

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 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 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
2022.1	MS3	QPH113MS
2022.1	MS8	QPF017MS
2020.2	MS8	QPF009MS
2019.1	MS2	QOR138MS
2019.1	MS3	QPH101MS
2017.2	MS3	QPH096MS

Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
pp'-DDD	µg/kg	0.759	0.0926	12.2	17	0.746	0.0640	0.0281	0.711 - 0.806
pp'-DDE	µg/kg	0.275	0.0483	17.5	16	0.290	0.0347	0.0151	0.250 - 0.301

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	0.776	0.0709	9.1	12	0.779	0.0490	0.0256	0.732 - 0.821

Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PCB31	µg/kg	0.236	0.0968	41.0	17	0.258	0.0700	0.0293	0.186 - 0.285
PCB52	µg/kg	0.351	0.1989	56.7	20	0.422	0.1546	0.0556	0.258 - 0.444
PCB101	µg/kg	0.528	0.1925	36.5	22	0.565	0.1478	0.0513	0.443 - 0.613
PCB105	µg/kg	0.178	0.1376	77.5	12	0.189	0.0875	0.0497	0.0911 - 0.264
PCB118	µg/kg	0.428	0.1843	43.0	21	0.482	0.1400	0.0503	0.345 - 0.512
PCB138+PCB163	µg/kg	1.37	0.431	31.5	4	1.38	0.305	0.269	0.768 - 1.96
PCB138	µg/kg	0.814	0.3824	47.0	22	0.884	0.2730	0.1019	0.645 - 0.983
PCB153	µg/kg	0.867	0.3534	40.8	22	0.895	0.2525	0.0942	0.710 - 1.02
PCB156	µg/kg	0.0901	0.0441	48.9	10	0.1020	0.0310	0.0174	0.0591 - 0.121
PCB180	µg/kg	0.571	0.1738	30.5	22	0.637	0.1300	0.0463	0.494 - 0.648
HCB	µg/kg	0.204	0.0623	30.6	14	0.214	0.0405	0.0208	0.168 - 0.240
HCBD	µg/kg	0.142	0.0537	37.7	6	0.149	0.0365	0.0274	0.0889 - 0.196
Dieldrin	µg/kg	0.116	0.0380	32.8	7	0.130	0.0290	0.0180	0.0819 - 0.150
pp'-DDT	µg/kg	0.137	0.0279	20.4	15	0.137	0.0194	0.0090	0.121 - 0.152

Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Anthracene	µg/kg	11.5	3.10	27.1	67	11.7	2.10	0.47	10.7 - 12.2
Benzo[a]anthracene	µg/kg	54.8	9.37	17.1	66	54.8	6.18	1.44	52.5 - 57.1
Benzo[a]pyrene	µg/kg	67.6	9.00	13.3	70	67.5	6.12	1.34	65.5 - 69.7
Benzo[b]fluoranthene	µg/kg	112	27.5	24.5	56	112	18.9	4.6	105 - 120
Benzo[e]pyrene	µg/kg	84.2	15.34	18.2	49	83.1	10.12	2.74	79.8 - 88.6
Benzo[g,h,i]perylene	µg/kg	85.3	11.97	14.0	70	84.1	7.95	1.79	82.5 - 88.2
Benzo[k]fluoranthene	µg/kg	46.8	6.85	14.6	61	47.4	4.71	1.10	45.0 - 48.5
Chrysene + Triphenylene	µg/kg	69.9	9.68	13.8	26	72.1	6.65	2.37	66.0 - 73.8
Chrysene	µg/kg	51.7	7.06	13.7	50	52.4	5.00	1.25	49.7 - 53.7
Dibenz[a,h]anthracene	µg/kg	17.4	3.69	21.2	65	17.3	2.50	0.57	16.5 - 18.3
Fluoranthene	µg/kg	101	15.9	15.8	71	99.4	10.9	2.4	96.8 - 104.3
Indeno[1,2,3-cd]pyrene	µg/kg	86.2	16.46	19.1	71	86.8	10.80	2.44	82.3 - 90.1
Naphthalene	µg/kg	36.7	10.03	27.3	63	36.8	6.50	1.58	34.2 - 39.2
Perylene	µg/kg	18.4	2.15	11.7	40	18.5	1.52	0.43	17.7 - 19.1
Phenanthrene	µg/kg	114	40.4	35.3	68	113	27.0	6.1	105 - 124
Pyrene	µg/kg	98.1	17.39	17.7	68	95.7	11.89	2.64	93.9 - 102
Benzofluoranthenes (b+j)	µg/kg	164	25.4	15.4	10	161	16.5	10.0	146 - 182

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	0.783	0.0579	7.4	37	0.780	0.0400	0.0119	0.764 - 0.803

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PN	%	0.1000	0.0074	7.4	12	0.0994	0.0050	0.0027	0.0953 - 0.105

Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Acenaphthene	µg/kg	15.6	11.96	76.6	61	17.9	8.58	1.91	12.6 - 18.7
Acenaphthylene	µg/kg	4.64	2.505	54.0	48	4.67	1.666	0.452	3.91 - 5.36
Benzo[a]fluorene	µg/kg	16.3	8.91	54.7	6	17.0	6.17	4.55	7.39 - 25.2
Dibenzothiophene	µg/kg	21.0	13.52	64.4	32	21.2	9.16	2.99	16.1 - 25.9
Fluorene	µg/kg	20.5	8.96	43.6	62	22.1	6.37	1.42	18.3 - 22.8
Triphenylene	µg/kg	22.5	5.24	23.3	15	23.0	3.58	1.69	19.6 - 25.3
Benzofluoranthenes (a+b+j+k)	µg/kg	179	24.7	13.8	8	184	16.4	10.9	159 - 199
1-methylpyrene	µg/kg	17.6	9.89	56.3	7	18.0	6.78	4.67	8.72 - 26.4
1-methylphenanthrene	µg/kg	38.0	14.24	37.4	5	39.8	10.10	7.96	21.7 - 54.4
2-methylphenanthrene	µg/kg	54.5	16.97	31.1	21	54.7	12.30	4.63	46.8 - 62.2
3-6-dimethylphenanthrene	µg/kg	9.00	2.482	27.6	17	9.20	1.700	0.752	7.73 - 10.3
1-methylnaphtalene	µg/kg	47.5	9.62	20.2	7	48.3	7.56	4.55	38.9 - 56.1
2-methylnaphtalene	µg/kg	77.0	34.97	45.4	7	82.4	25.65	16.52	45.8 - 108
C1-phenanthr.+anthrac.	µg/kg	154	59.4	38.6	23	154	41.2	15.5	128 - 180
C2-phenanthr.+anthrac.	µg/kg	103	37.8	36.6	21	101	23.7	10.3	86.0 - 120
C3-phenanthr.+anthrac.	µg/kg	65.8	15.19	23.1	15	68.3	10.26	4.90	57.4 - 74.2
C1-pyrenes+fluoranthenes	µg/kg	104	47.6	45.9	15	107	31.2	15.4	77.5 - 130
C2-pyrenes+fluoranthenes	µg/kg	100	26.3	26.2	8	92.1	16.5	11.6	78.8 - 122
C1-chrysenes	µg/kg	92.1	20.92	22.7	13	90.8	14.20	7.25	79.6 - 105
C2-chrysenes	µg/kg	74.2	53.79	72.5	10	71.0	37.49	21.26	36.3 - 112
C1-benzofluoranthenes	µg/kg	133	32.5	24.5	4	126	21.9	20.3	87.5 - 178
C1-naphtalenes	µg/kg	115	46.8	40.6	13	116	30.6	16.2	87.2 - 143
C2-naphtalenes	µg/kg	203	144.0	71.0	14	204	99.2	48.1	120 - 285
C3-napthalenes	µg/kg	136	96.2	70.9	14	143	68.2	32.1	80.5 - 191

Method: Total petroleum hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Total petroleum hydrocarbons	mg/kg	41.4	9.34	22.6	4	41.6	6.66	5.84	28.4 - 54.4

Indicative Values MS8

Method: Perfluorinated alkyl substances - MS8

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
n-PFOS	µg/kg	0.101	0.0227	22.4	10	0.105	0.0161	0.0090	0.0853 - 0.117
total PFOS	µg/kg	0.127	0.0242	19.0	7	0.125	0.0148	0.0114	0.106 - 0.149
PFOA	µg/kg	0.0749	0.0123	16.4	7	0.0768	0.0076	0.0058	0.0639 - 0.0859
PFNA	µg/kg	0.0155	0.0018	11.7	4	0.0158	0.0012	0.0011	0.0130 - 0.0180
PFDA	µg/kg	0.0219	0.0064	29.2	4	0.0220	0.0044	0.0040	0.0130 - 0.0308
PFUnDA	µg/kg	0.0336	0.0155	46.2	5	0.0315	0.0089	0.0087	0.0157 - 0.0515