QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 68

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Sediment 68

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.

Please note: Most WEPAL-QUASIMEME reference materials are found to be stable over the long term (>10 years) for most determinand/matrix combinations. There are a few exceptions known to us as being less stable over the long term. These are organotins in sediment (MS6), ASP in shellfish (BT7), some PAHs and PCBs in sediment (SETOC) and N-NH_4 (as N) in clay soils (ISE).

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 68 of Westerscheldt Rilland Bath from Westerscheldt, the 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
2022.2	MS3	QPH116MS
2022.2	MS6	QSP084MS
2022.2	MS7	QBC074MS
2023.1	MS8	QPF022MS

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	69.8	11.4	16.3	15	69.6	8.99	3.68	5.27
Indeno[1,2,3-cd]pyrene	µg/kg	74.7	15.0	20.1	25	75.0	10.5	3.76	5.03
Pyrene	µg/kg	99.9	17.5	17.6	23	101	14.1	4.57	4.58
Benzo[g,h,i]perylene	µg/kg	62.6	13.8	22.1	25	63.9	8.20	3.46	5.52
Fluoranthene	µg/kg	124	26.5	21.4	25	126	17.0	6.63	5.34
Benzo[a]pyrene	µg/kg	78.7	16.6	21.1	24	80.5	9.46	4.25	5.39
Benzo[k]fluoranthene	µg/kg	46.4	8.73	18.8	21	50.5	8.70	2.38	5.13
Anthracene	µg/kg	21.5	5.25	24.4	24	22.3	3.90	1.34	6.22
Dibenzothiophene	µg/kg	6.48	0.957	14.8	11	6.73	0.540	0.361	5.57

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	1.07	0.077	7.2	14	1.07	0.049	0.026	2.40

Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Chrysene + Triphenylene	µg/kg	85.4	22.9	26.9	8	88.1	13.2	10.1	11.9
Phenanthrene	µg/kg	67.8	16.7	24.7	24	67.4	12.1	4.27	6.29
Benzo[a]anthracene	µg/kg	70.4	18.0	25.6	22	70.5	13.5	4.81	6.82
Benzo[b]fluoranthene	µg/kg	106	25.4	23.8	22	105	18.3	6.76	6.36
Naphthalene	µg/kg	37.2	10.2	27.4	22	37.8	6.85	2.71	7.30
Dibenz[a,h]anthracene	µg/kg	18.4	5.28	28.6	22	18.7	3.73	1.41	7.63
Fluorene	µg/kg	16.8	4.80	28.6	23	16.5	3.09	1.25	7.45
Acenaphthene	µg/kg	11.9	3.64	30.7	23	12.2	2.62	0.950	8.01
Acenaphthylene	µg/kg	9.84	4.95	50.3	19	11.2	3.72	1.42	14.4
3-6-dimethylphenanthrene	µg/kg	2.85	0.800	28.1	4	2.92	0.361	0.500	17.6
2-methylphenanthrene	µg/kg	18.3	5.24	28.6	7	17.1	3.10	2.48	13.5
Perylene	µg/kg	50.4	13.5	26.7	13	47.2	9.64	4.67	9.26
Triphenylene	µg/kg	16.4	2.60	15.8	6	17.0	1.69	1.33	8.07
Chrysene	µg/kg	67.8	19.2	28.3	20	68.1	12.4	5.37	7.92
Benzofluoranthenes (b+j)	µg/kg	154	26.1	17.0	5	153	15.8	14.6	9.52
C1-phenanthr.+anthrac.	µg/kg	55.5	18.8	33.8	8	55.3	10.3	8.31	15.0
C2-phenanthr.+anthrac.	µg/kg	44.9	18.2	40.6	8	47.1	12.7	8.06	18.0
C3-phenanthr.+anthrac.	µg/kg	29.0	3.65	12.6	6	29.0	1.65	1.86	6.42
C1-pyrenes+fluoranthenes	µg/kg	82.1	35.1	42.8	4	81.3	24.1	21.9	26.7
C1-chrysenes	µg/kg	53.9	18.5	34.3	4	54.0	10.9	11.6	21.4
C1-naphtalenes	µg/kg	36.2	11.7	32.4	5	37.2	7.51	6.55	18.1
C2-naphtalenes	µg/kg	32.8	18.7	57.1	7	33.3	10.6	8.83	27.0
C3-napthalenes	µg/kg	32.1	15.5	48.4	7	29.8	8.40	7.33	22.8
C1-dibenzothiophenes	µg/kg	8.39	2.43	29.0	4	8.54	1.11	1.52	18.1
C2-dibenzothiophenes	µg/kg	17.0	6.12	36.1	4	16.6	2.96	3.83	22.5
1-methylphenanthrene	µg/kg	10.8	3.03	28.0	5	11.0	1.40	1.69	15.7
1-methylnaphtalene	µg/kg	11.3	5.00	44.4	8	11.4	2.91	2.21	19.6
2-methylnaphtalene	µg/kg	20.0	9.89	49.3	8	23.0	7.13	4.37	21.8

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PN	%	0.093	0.012	13.4	6	0.093	0.007	0.006	6.85

Indicative Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Tributyltin (TBT)	µg Sn/kg	1.21	0.420	34.6	15	1.15	0.320	0.135	11.2
Dibutyltin (DBT)	µg Sn/kg	3.31	0.992	30.0	17	3.23	0.731	0.301	9.09
Monobutyltin (MBT)	µg Sn/kg	6.73	3.87	57.4	13	7.06	2.21	1.34	19.9

Indicative Values MS7

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
BDE047	µg/kg	0.088	0.023	25.9	9	0.093	0.012	0.009	10.8
BDE099	µg/kg	0.074	0.021	27.8	10	0.074	0.011	0.008	11.0
BDE100	µg/kg	0.028	0.012	41.4	7	0.028	0.005	0.006	19.6
BDE153	µg/kg	0.040	0.015	37.8	7	0.039	0.009	0.007	17.9
BDE154	µg/kg	0.030	0.009	31.6	6	0.031	0.005	0.005	16.1
BDE209	µg/kg	171	35.9	21.0	11	169	22.8	13.5	7.90

Indicative Values MS8

Method: Perfluorinated alkyl substances - MS8

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
n-PFOS	µg/kg	0.522	0.060	11.5	6	0.519	0.043	0.031	5.85
PFOSA	µg/kg	0.191	0.048	25.1	7	0.183	0.027	0.023	11.8
PFBA	µg/kg	0.095	0.064	67.6	6	0.136	0.043	0.033	34.5
PFHxA	µg/kg	0.056	0.007	11.6	5	0.058	0.003	0.004	6.47
PFOA	µg/kg	0.210	0.049	23.1	8	0.207	0.031	0.021	10.2
PFUnDA	µg/kg	0.082	0.024	29.7	5	0.080	0.017	0.014	16.6
PFDoA	µg/kg	0.070	0.017	24.2	5	0.069	0.009	0.009	13.5
total-PFOS	µg/kg	0.588	0.107	18.2	7	0.582	0.060	0.051	8.61
NMeFOSAA	µg/kg	0.246	0.101	41.1	6	0.256	0.055	0.052	21.0
NEtFOSAA	µg/kg	0.556	0.085	15.2	6	0.551	0.049	0.043	7.77