QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 46

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Sediment 46

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 46 of harbor sediment from Klaipeda and Zeebrugge harbor 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
2019.1	MS3	QPH102MS
2025.1	MS6	QSP093MS
2023.1	MS6	QSP085MS
2020.2	MS6	QSP074MS
2019.1	MS6	QSP069MS
2019.2	MS7	QBC061MS
2018.2	MS8	QPF006MS

Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Chrysene + Triphenylene	µg/kg	54.8	2.15	3.9	9	54.9	1.00	0.894	1.63
Phenanthrene	µg/kg	71.9	12.9	17.9	22	72.2	7.70	3.43	4.77
Pyrene	µg/kg	75.3	11.5	15.3	22	72.9	6.94	3.07	4.08
Fluoranthene	µg/kg	107	18.0	16.8	22	104	11.3	4.80	4.48
Chrysene	µg/kg	45.5	7.84	17.2	17	44.6	5.37	2.38	5.22

Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Benzo[e]pyrene	µg/kg	38.9	9.78	25.1	16	38.0	5.68	3.06	7.86
Indeno[1,2,3-cd]pyrene	µg/kg	37.8	9.99	26.4	23	38.9	5.05	2.60	6.89
Benzo[g,h,i]perylene	µg/kg	32.8	9.80	29.9	23	32.3	4.75	2.55	7.79
Benzo[a]anthracene	µg/kg	40.6	9.67	23.8	21	40.6	5.60	2.64	6.50
Benzo[b]fluoranthene	µg/kg	54.4	18.0	33.1	19	56.8	11.9	5.16	9.50
Benzo[a]pyrene	µg/kg	34.3	8.39	24.5	23	34.0	5.35	2.19	6.37
Naphthalene	µg/kg	12.6	4.01	31.8	18	12.8	2.37	1.18	9.36
Dibenz[a,h]anthracene	µg/kg	7.66	2.55	33.3	20	7.60	1.16	0.714	9.32
Benzo[k]fluoranthene	µg/kg	25.4	6.62	26.0	20	25.1	4.56	1.85	7.28
Anthracene	µg/kg	8.88	2.20	24.7	22	8.71	1.43	0.585	6.59
Fluorene	µg/kg	7.14	2.20	30.8	18	6.99	1.49	0.648	9.09
Acenaphthene	µg/kg	4.37	1.33	30.4	16	4.44	0.693	0.415	9.49
Acenaphthylene	µg/kg	2.67	1.63	60.9	15	2.68	0.958	0.525	19.7
Dibenzothiophene	µg/kg	7.88	4.10	52.0	9	8.71	1.89	1.71	21.7
3-6-dimethylphenanthrene	µg/kg	2.59	0.951	36.7	6	2.96	0.749	0.485	18.7
2-methylphenanthrene	µg/kg	20.6	7.34	35.7	6	19.9	2.89	3.75	18.2
Perylene	µg/kg	21.3	4.54	21.3	14	21.0	3.32	1.52	7.11
Triphenylene	µg/kg	11.9	2.39	20.1	5	11.6	1.20	1.34	11.3
C1-phenanthr.+anthrac.	µg/kg	61.1	29.6	48.5	8	65.8	17.1	13.1	21.5
C2-phenanthr.+anthrac.	µg/kg	58.9	5.07	8.6	7	56.7	3.80	2.39	4.07
C3-phenanthr.+anthrac.	µg/kg	23.6	9.43	40.0	5	25.4	5.86	5.27	22.4
C1-pyrenes+fluoranthenes	µg/kg	50.8	20.7	40.7	5	47.1	11.0	11.6	22.8
C1-chrysenes	µg/kg	31.0	7.78	25.1	5	30.0	4.48	4.35	14.0
C1-naphtalenes	µg/kg	14.4	6.25	43.5	6	15.4	3.47	3.19	22.2
C2-naphtalenes	µg/kg	17.2	10.9	63.3	6	15.3	6.28	5.54	32.3

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	0.841	0.208	24.7	12	0.823	0.141	0.075	8.91

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PN	%	0.097	0.009	8.9	4	0.098	0.005	0.005	5.58

Indicative Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Tributyltin (TBT)	µg Sn/kg	2.48	1.32	53.2	61	2.68	0.888	0.211	8.51
Dibutyltin (DBT)	µg Sn/kg	2.49	1.06	42.5	51	2.71	0.761	0.185	7.44
Monobutyltin (MBT)	µg Sn/kg	6.26	2.71	43.4	45	6.09	1.59	0.506	8.08
Triphenyltin (TPhT)	µg Sn/kg	0.499	0.452	90.5	20	0.582	0.362	0.126	25.3
Diphenyltin (DPhT)	µg Sn/kg	1.02	0.725	71.3	12	1.15	0.537	0.262	25.7
Monophenyltin (MPhT)	µg Sn/kg	2.82	3.42	121.2	13	3.28	2.79	1.18	42.0

Indicative Values MS7

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
BDE047	µg/kg	0.021	0.009	46.2	5	0.021	0.006	0.005	25.8
BDE183	µg/kg	0.027	0.003	9.4	4	0.028	0.001	0.002	5.89
BDE209	µg/kg	18.5	3.81	20.6	6	18.4	1.50	1.95	10.5

Indicative Values MS8

Method: Perfluorinated alkyl substances - MS8

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
n-PFOS	µg/kg	0.496	0.061	12.4	7	0.504	0.035	0.029	5.84
PFOA	µg/kg	0.149	0.016	10.4	5	0.151	0.007	0.009	5.83
PFNA	µg/kg	0.068	0.024	35.6	4	0.071	0.015	0.015	22.3
PFDA	µg/kg	0.134	0.036	26.9	5	0.145	0.024	0.020	15.0
PFUnDA	µg/kg	0.073	0.035	48.2	5	0.068	0.016	0.020	26.9