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 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 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
2023.1	MS6	QSP085MS
2020.2	MS6	QSP074MS
2019.2	MS7	QBC061MS
2019.1	MS3	QPH102MS
2019.1	MS6	QSP069MS
2018.2	MS8	QPF006MS

Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Phenanthrene	µg/kg	71.9	12.87	17.9	22	72.2	7.70	3.43	66.2 - 77.6
Pyrene	µg/kg	75.3	11.53	15.3	22	72.9	6.94	3.07	70.2 - 80.4
Fluoranthene	µg/kg	107	18.0	16.8	22	104	11.3	4.8	99.3 - 115
Chrysene	µg/kg	45.5	7.86	17.3	17	44.6	5.37	2.38	41.5 - 49.5

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	54.8	2.14	3.9	9	54.9	1.00	0.89	53.2 - 56.4
Benzo[e]pyrene	µg/kg	38.9	9.79	25.2	16	38.0	5.68	3.06	33.7 - 44.1
Indeno[1,2,3-cd]pyrene	µg/kg	37.8	10.03	26.6	23	38.9	5.05	2.62	33.4 - 42.1
Benzo[g,h,i]perylene	µg/kg	32.8	9.84	30.0	23	32.3	4.75	2.56	28.5 - 37.0
Benzo[a]anthracene	µg/kg	40.6	9.71	23.9	21	40.6	5.60	2.65	36.2 - 45.0
Benzo[b]fluoranthene	µg/kg	54.4	18.09	33.2	19	56.8	11.90	5.19	45.7 - 63.1
Benzo[a]pyrene	µg/kg	34.3	8.43	24.6	23	34.0	5.35	2.20	30.7 - 38.0
Naphthalene	µg/kg	12.6	4.01	31.8	18	12.8	2.37	1.18	10.6 - 14.6
Dibenz[a,h]anthracene	µg/kg	7.66	2.554	33.4	20	7.60	1.155	0.714	6.47 - 8.85
Benzo[k]fluoranthene	µg/kg	25.4	6.62	26.0	20	25.1	4.56	1.85	22.3 - 28.5
Anthracene	µg/kg	8.88	2.197	24.7	22	8.71	1.435	0.586	7.91 - 9.86
Fluorene	µg/kg	7.14	2.202	30.9	18	6.99	1.485	0.649	6.05 - 8.23
Acenaphthene	µg/kg	4.37	1.329	30.4	16	4.44	0.693	0.415	3.67 - 5.08
Acenaphthylene	µg/kg	2.67	1.632	61.0	15	2.68	0.958	0.527	1.78 - 3.57
Dibenzothiophene	µg/kg	7.88	4.096	52.0	9	8.71	1.888	1.707	4.79 - 11.0
3-6-dimethylphenanthrene	µg/kg	2.59	0.950	36.7	6	2.96	0.749	0.485	1.64 - 3.54
2-methylphenanthrene	µg/kg	20.6	7.34	35.6	6	19.9	2.89	3.74	13.3 - 27.9
Perylene	µg/kg	21.3	4.55	21.3	14	21.0	3.32	1.52	18.7 - 23.9
Triphenylene	µg/kg	-	-	-	5	11.6	1.2	-	- - -
C1-phenanthr.+anthrac.	µg/kg	61.1	29.64	48.5	8	65.8	17.08	13.10	36.9 - 85.2
C2-phenanthr.+anthrac.	µg/kg	58.9	5.06	8.6	7	56.7	3.80	2.39	54.4 - 63.4
C3-phenanthr.+anthrac.	µg/kg	-	-	-	5	25.4	5.9	-	- - -
C1-pyrenes+fluoranthenes	µg/kg	-	-	-	5	47.1	11.0	-	- - -
C1-chrysenes	µg/kg	-	-	-	5	30.0	4.5	-	- - -
C1-naphtalenes	µg/kg	14.4	6.25	43.5	6	15.4	3.47	3.19	8.12 - 20.6
C2-naphtalenes	µg/kg	17.2	10.86	63.3	6	15.3	6.28	5.54	6.31 - 28.0

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	0.841	0.2083	24.8	12	0.823	0.1405	0.0751	0.710 - 0.972

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PN	%	-	-	-	4	0.0980	0.0	-	- - -

Indicative Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Tributyltin (TBT)	µg Sn/kg	2.52	1.262	50.0	45	2.83	0.930	0.235	2.15 - 2.90
Dibutyltin (DBT)	µg Sn/kg	2.44	0.911	37.4	40	2.65	0.716	0.180	2.15 - 2.73
Monobutyltin (MBT)	µg Sn/kg	6.27	2.787	44.5	34	6.35	1.628	0.597	5.30 - 7.24
Triphenyltin (TPhT)	µg Sn/kg	0.497	0.4097	82.4	15	0.570	0.3400	0.1322	0.272 - 0.722
Diphenyltin (DPhT)	µg Sn/kg	0.918	0.6975	76.0	10	0.721	0.4274	0.2757	0.426 - 1.41

Indicative Values MS7

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
BDE047	µg/kg	-	-	-	5	0.0500	0.0	-	-	-	-
BDE099	µg/kg	-	-	-	4	0.0500	0.0	-	-	-	-
BDE183	µg/kg	-	-	-	4	0.0300	0.0	-	-	-	-
BDE209	µg/kg	18.5	3.81	20.6	6	18.4	1.50	1.94	14.7	-	22.3

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	0.496	0.0613	12.4	7	0.504	0.0351	0.0290	0.441	-	0.551
PFOA	µg/kg	-	-	-	5	0.153	0.0	-	-	-	-
PFNA	µg/kg	-	-	-	4	0.0706	0.0	-	-	-	-
PFDA	µg/kg	-	-	-	5	0.151	0.1	-	-	-	-
PFUnDA	µg/kg	-	-	-	5	0.0983	0.0	-	-	-	-