QUASIMEME

Quality assurance of information for marine environmental monitoring

---

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 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 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
2023.1	MS8	QPF022MS
2022.2	MS3	QPH116MS
2022.2	MS6	QSP084MS
2022.2	MS7	QBC074MS

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	69.8	11.43	16.4	15	69.6	8.99	3.69	63.6 - 76.1
Indeno[1,2,3-cd]pyrene	µg/kg	74.7	15.10	20.2	25	75.0	10.52	3.77	68.5 - 80.9
Pyrene	µg/kg	99.9	17.60	17.6	23	100.7	14.10	4.59	92.3 - 107
Benzo[g,h,i]perylene	µg/kg	62.7	13.89	22.2	25	63.9	8.20	3.47	56.9 - 68.4
Fluoranthene	µg/kg	124	26.6	21.4	25	126	17.0	6.7	113 - 135
Benzo[a]pyrene	µg/kg	78.7	16.64	21.1	24	80.5	9.46	4.25	71.7 - 85.7
Benzo[k]fluoranthene	µg/kg	46.4	8.77	18.9	21	50.5	8.70	2.39	42.4 - 50.4
Anthracene	µg/kg	21.5	5.25	24.4	24	22.3	3.90	1.34	19.3 - 23.8
Dibenzothiophene	µg/kg	6.48	0.956	14.8	11	6.73	0.540	0.360	5.84 - 7.11

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	1.07	0.077	7.2	14	1.07	0.049	0.026	1.03 - 1.11

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	85.4	22.93	26.9	8	88.1	13.21	10.14	66.7 - 104
Phenanthrene	µg/kg	67.8	16.72	24.7	24	67.4	12.13	4.27	60.8 - 74.9
Benzo[a]anthracene	µg/kg	70.4	18.03	25.6	22	70.5	13.52	4.81	62.4 - 78.4
Benzo[b]fluoranthene	µg/kg	106	25.4	23.8	22	105	18.3	6.8	95.1 - 118
Naphthalene	µg/kg	37.2	10.18	27.4	22	37.8	6.85	2.71	32.7 - 41.7
Dibenz[a,h]anthracene	µg/kg	18.4	5.28	28.6	22	18.7	3.73	1.41	16.1 - 20.8
Fluorene	µg/kg	16.8	4.82	28.7	23	16.5	3.09	1.26	14.7 - 18.9
Acenaphthene	µg/kg	11.9	3.66	30.9	23	12.2	2.62	0.95	10.3 - 13.4
Acenaphthylene	µg/kg	9.84	4.965	50.4	19	11.24	3.720	1.424	7.46 - 12.2
3-6-dimethylphenanthrene	µg/kg	-	-	-	4	2.92	0.7	-	- - -
2-methylphenanthrene	µg/kg	18.3	5.24	28.6	7	17.1	3.10	2.47	13.7 - 23.0
Perylene	µg/kg	50.4	13.48	26.7	13	47.2	9.64	4.67	42.3 - 58.5
Triphenylene	µg/kg	16.4	2.60	15.8	6	17.0	1.69	1.33	13.8 - 19.0
Chrysene	µg/kg	67.8	19.21	28.3	20	68.1	12.44	5.37	58.8 - 76.8
Benzofluoranthenes (b+j)	µg/kg	-	-	-	5	153	15.8	-	- - -
C1-phenanthr.+anthrac.	µg/kg	55.5	18.80	33.8	8	55.3	10.32	8.31	40.2 - 70.9
C2-phenanthr.+anthrac.	µg/kg	44.9	18.24	40.6	8	47.1	12.68	8.06	30.0 - 59.8
C3-phenanthr.+anthrac.	µg/kg	29.0	3.65	12.6	6	29.0	1.65	1.86	25.3 - 32.6
C1-pyrenes+fluoranthenes	µg/kg	-	-	-	4	81.3	24.1	-	- - -
C1-chrysenes	µg/kg	-	-	-	4	54.0	10.9	-	- - -
C1-naphtalenes	µg/kg	-	-	-	5	37.2	7.5	-	- - -
C2-naphtalenes	µg/kg	32.7	18.67	57.0	7	33.3	10.65	8.82	16.1 - 49.4
C3-napthalenes	µg/kg	32.1	15.50	48.3	7	29.8	8.40	7.32	18.2 - 45.9
C1-dibenzothiophenes	µg/kg	-	-	-	4	8.54	1.1	-	- - -
C2-dibenzothiophenes	µg/kg	-	-	-	4	16.6	3.0	-	- - -
1-methylphenanthrene	µg/kg	-	-	-	5	11.0	1.4	-	- - -
1-methylnaphtalene	µg/kg	11.3	5.00	44.4	8	11.4	2.91	2.21	7.18 - 15.3
2-methylnaphtalene	µg/kg	20.0	9.89	49.3	8	23.0	7.13	4.37	12.0 - 28.1

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PN	%	0.0928	0.0124	13.4	6	0.0930	0.0065	0.0063	0.0803 - 0.105

Indicative Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Tributyltin (TBT)	µg Sn/kg	1.21	0.421	34.7	15	1.15	0.320	0.136	0.980 - 1.44
Dibutyltin (DBT)	µg Sn/kg	3.31	0.995	30.1	17	3.23	0.731	0.302	2.80 - 3.82
Monobutyltin (MBT)	µg Sn/kg	6.73	3.873	57.5	13	7.06	2.210	1.343	4.41 - 9.05
Triphenyltin (TPhT)	µg Sn/kg	-	-	-	4	0.353	0.3	-	- - -

Indicative Values MS7

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
BDE028	µg/kg	-	-	-	5	0.0363	0.0	-	- - -
BDE047	µg/kg	0.0877	0.0227	25.9	9	0.0930	0.0120	0.0095	0.0705 - 0.105
BDE099	µg/kg	0.0741	0.0207	28.0	10	0.0743	0.0110	0.0082	0.0595 - 0.0887
BDE100	µg/kg	0.0285	0.0118	41.4	7	0.0280	0.0054	0.0056	0.0180 - 0.0390
BDE153	µg/kg	0.0400	0.0151	37.8	7	0.0392	0.0088	0.0071	0.0265 - 0.0535
BDE154	µg/kg	0.0297	0.0094	31.6	6	0.0306	0.0053	0.0048	0.0203 - 0.0391
BDE209	µg/kg	171	35.9	21.0	11	169	22.8	13.5	147 - 195

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	0.522	0.0598	11.5	6	0.519	0.0433	0.0305	0.462 - 0.582
PFOSA	µg/kg	0.191	0.0480	25.1	7	0.183	0.0270	0.0227	0.149 - 0.234
PFBA	µg/kg	0.0947	0.0640	67.6	6	0.136	0.0428	0.0327	0.0308 - 0.159
PFHxA	µg/kg	-	-	-	5	0.0695	0.0	-	- - -
PFOA	µg/kg	0.210	0.0486	23.1	8	0.207	0.0314	0.0215	0.170 - 0.250
PFUnDA	µg/kg	-	-	-	5	0.0984	0.0	-	- - -
PFDoA	µg/kg	-	-	-	5	0.0945	0.0	-	- - -
total-PFOS	µg/kg	0.588	0.1071	18.2	7	0.582	0.0602	0.0506	0.492 - 0.684
NMeFOSAA	µg/kg	0.246	0.1009	41.1	6	0.256	0.0548	0.0515	0.145 - 0.346
NEtFOSAA	µg/kg	0.556	0.0846	15.2	6	0.551	0.0494	0.0432	0.472 - 0.641