QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 26

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Sediment 26

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 26 of Estuarine sediment from Venice lagoon, Italy 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
2018.1	MS6	QSP064MS
2017.2	MS3	QPH095MS
2017.1	MS6	QSP060MS
2015.2	MS2	QOR124MS
2015.1	MS3	QPH086MS
2015.1	MS6	QSP053MS

Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PCB31	µg/kg	5.02	0.998	19.9	18	5.15	0.720	0.294	4.53 - 5.52
PCB52	µg/kg	11.6	1.97	17.0	21	12.1	1.30	0.54	10.7 - 12.5
PCB101	µg/kg	24.7	3.99	16.1	21	24.8	2.80	1.09	22.9 - 26.5
PCB118	µg/kg	12.4	1.45	11.7	20	12.9	1.07	0.41	11.7 - 13.1
PCB153	µg/kg	42.5	8.97	21.1	21	43.5	6.32	2.45	38.4 - 46.6

Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PCB105	µg/kg	3.15	1.244	39.5	13	3.24	0.900	0.431	2.40 - 3.89
PCB138+PCB163	µg/kg	37.2	4.73	12.7	4	38.7	3.40	2.95	30.7 - 43.8
PCB138	µg/kg	32.3	10.17	31.5	18	32.4	6.66	3.00	27.2 - 37.3
PCB156	µg/kg	3.44	1.121	32.6	13	3.70	0.770	0.389	2.77 - 4.11
PCB180	µg/kg	34.6	8.55	24.7	21	36.7	5.86	2.33	30.7 - 38.5
HCB	µg/kg	255	73.2	28.7	14	245	51.4	24.5	213 - 297
Dieldrin	µg/kg	1.01	0.240	23.7	5	1.02	0.174	0.134	0.737 - 1.29
pp'-DDD	µg/kg	17.1	8.57	50.0	12	17.3	5.77	3.09	11.7 - 22.5
pp'-DDE	µg/kg	8.43	2.637	31.3	14	8.59	1.845	0.881	6.92 - 9.94
op'-DDT	µg/kg	54.0	18.13	33.6	9	53.1	12.75	7.56	40.3 - 67.7
pp'-DDT	µg/kg	217	66.6	30.7	12	214	44.8	24.0	175 - 259

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	1.56	0.270	17.4	8	1.54	0.185	0.119	1.34 - 1.78

Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Acenaphthene	µg/kg	1110	192	17.3	45	1080	134	36	1050 - 1165
Acenaphthylene	µg/kg	620	113.6	18.3	40	622	74.3	22.5	583 - 656
Anthracene	µg/kg	410	69.9	17.0	52	419	48.1	12.1	391 - 430
Benzo[a]anthracene	µg/kg	959	159.1	16.6	51	957	107.0	27.9	914 - 1004
Benzo[a]pyrene	µg/kg	785	175.2	22.3	52	783	119.5	30.4	736 - 834
Benzo[b]fluoranthene	µg/kg	1190	265	22.2	47	1170	175	48	1116 - 1271
Benzo[e]pyrene	µg/kg	832	182.1	21.9	32	836	125.8	40.2	766 - 897
Benzo[g,h,i]perylene	µg/kg	1230	243	19.8	53	1250	172	42	1163 - 1297
Benzo[k]fluoranthene	µg/kg	474	87.7	18.5	47	489	61.0	16.0	448 - 500
Chrysene + Triphenylene	µg/kg	1290	285	22.1	23	1300	190	74	1167 - 1413
Chrysene	µg/kg	1120	162	14.5	34	1120	106	35	1060 - 1173
Dibenz[a,h]anthracene	µg/kg	142	45.8	32.2	50	144	31.4	8.1	129 - 155
Dibenzothiophene	µg/kg	163	39.2	24.0	24	167	27.2	10.0	147 - 180
Fluoranthene	µg/kg	4060	632	15.5	53	4080	403	108	3891 - 4239
Fluorene	µg/kg	618	121.7	19.7	45	624	78.0	22.7	582 - 655
Indeno[1,2,3-cd]pyrene	µg/kg	841	219.7	26.1	53	873	151.0	37.7	781 - 902
Naphthalene	µg/kg	3820	655	17.1	46	3750	465	121	3629 - 4018
Perylene	µg/kg	246	39.8	16.2	25	251	25.1	9.9	230 - 262
Phenanthrene	µg/kg	2810	469	16.7	51	2780	313	82	2680 - 2944
Pyrene	µg/kg	4040	638	15.8	51	4110	428	112	3858 - 4217
2-methylphenanthrene	µg/kg	268	30.8	11.5	17	263	21.0	9.3	253 - 284
C1-phenanthr.+anthrac.	µg/kg	818	131.2	16.0	13	848	83.3	45.5	739 - 897

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	1.76	0.461	26.1	28	1.79	0.319	0.109	1.59 - 1.94

Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Benzo[a]fluorene	µg/kg	210	92.3	43.9	5	206	51.0	51.6	104 - 316
Triphenylene	µg/kg	234	32.8	14.0	7	238	21.0	15.5	205 - 263
1-methylpyrene	µg/kg	175	54.6	31.1	6	176	37.9	27.9	121 - 230
3-6-dimethylphenanthrene	µg/kg	39.0	14.43	37.0	15	38.3	10.59	4.66	31.1 - 47.0
C2-phenanthr.+anthrac.	µg/kg	589	122.9	20.9	13	603	81.8	42.6	515 - 663
C3-phenanthr.+anthrac.	µg/kg	342	47.9	14.0	7	326	34.4	22.6	299 - 384
C1-pyrenes+fluoranthenes	µg/kg	1140	355	31.2	8	1150	224	157	847 - 1426
C2-pyrenes+fluoranthenes	µg/kg	358	157.8	44.1	4	366	100.5	98.6	139 - 577
C1-chrysenes	µg/kg	487	113.4	23.3	8	487	76.4	50.1	395 - 580
C2-chrysenes	µg/kg	157	43.5	27.6	4	173	32.8	27.2	97.1 - 218

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PN	%	0.131	0.0281	21.4	5	0.130	0.0180	0.0157	0.0989 - 0.163

Consensus Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Tributyltin (TBT)	µg Sn/kg	9.11	2.366	26.0	63	8.90	1.600	0.373	8.51 - 9.71
Dibutyltin (DBT)	µg Sn/kg	12.4	2.58	20.7	61	12.5	1.75	0.41	11.8 - 13.1
Monobutyltin (MBT)	µg Sn/kg	59.0	21.62	36.6	54	56.2	14.65	3.68	53.1 - 64.9

Indicative Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Monophenyltin (MPhT)	µg Sn/kg	1.06	0.392	36.9	11	1.22	0.240	0.148	0.803 - 1.32