WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 749

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis SETOC 749

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 8 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into three sections: Consensus Values, Indicative Values and Values for Information. The division is made on the reliability of the data. Consensus Values are based on at least 16 results while the coefficient of variation is smaller than 25 %. Indicative Values are based on at least 8 and less than 16 results or a coefficient of variation between 25 % and 50 %. Other values, based on more than 2 and less than 8 results or a coefficient of variation higher than 50 %, are given for information only.

In the sections with Consensus Values and Indicative Values the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median and MAD (Median of Absolute Deviation) and the uncertainty in the consensus values. The confidence limits (at 95 % probability) are calculated for these determinands.
In the section with Information Values the following parameters are given: median, MAD and number of results. For determinands which have at least 5 results reported as smaller than (<) the median of these 'smaller than results' is calculated. In some cases this median of '<' values is much smaller than median and mean of the indicative values. This may be caused by a too optimistic (too low) value for the detection limit reported by a (small) majority of participating laboratories who report '<'-values.

All values, expressed on a weight basis (kg or %), are reported in oven dry (105 °C) material. Moisture is reported in the material as received.

Sample information

WEPAL reference materials are from natural sources only. There is no spiking, mixing or other alterations of the samples. For sample preparation the SETOC samples are dried at 40 °C and milled to pass a 0.5 mm sieve.

This SETOC sample 749 of Sediment from Netherlands is prepared for the WEPAL proficiency programs. The sample is used in 1 period (or round). The results on which the values in this report are based were taken from the period given in the following table.

Year	Round	Number
1999	3	3

Consensus Values SETOC 749

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
anthracene	µg/kg	1730	382	22.1	56	1760	267	64	1623 - 1828
benz(a)anthracene	µg/kg	3900	499	12.8	57	3920	347	83	3765 - 4030
benzo(a)pyrene	µg/kg	3540	624	17.6	58	3500	435	102	3373 - 3701
benzo(b)fluoranthene	µg/kg	3540	783	22.1	50	3480	519	138	3319 - 3764
benzo(k)fluoranthene	µg/kg	1780	335	18.8	52	1800	228	58	1687 - 1874
chrysene	µg/kg	3900	810	20.8	57	3840	551	134	3683 - 4113
fluoranthene	µg/kg	6770	965	14.2	58	6650	655	158	6518 - 7026
indeno(1,2,3-cd)pyrene	µg/kg	2550	580	22.8	57	2500	400	96	2391 - 2699
phenanthrene	µg/kg	4510	850	18.9	57	4510	580	141	4282 - 4733
pyrene	µg/kg	5140	955	18.6	54	5020	663	163	4882 - 5404

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PCB 052	µg/kg	7.76	1.636	21.1	36	7.89	1.115	0.341	7.21 - 8.32
PCB 118	µg/kg	12.6	2.42	19.2	33	13.0	1.70	0.53	11.7 - 13.4
PCB 138	µg/kg	69.0	15.85	23.0	41	66.5	10.50	3.09	64.0 - 73.9

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
p,p`-DDT	µg/kg	41.9	3.29	7.8	17	42.0	2.30	1.00	40.3 - 43.6

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
As	mg/kg	40.1	3.61	9.0	31	40.0	2.60	0.81	38.8 - 41.5
Cd	mg/kg	2.85	0.240	8.4	33	2.84	0.160	0.052	2.76 - 2.93
Cr	mg/kg	66.2	7.78	11.7	34	66.1	5.05	1.67	63.5 - 69.0
Cu	mg/kg	359	24.2	6.7	34	363	16.5	5.2	351 - 368
Hg	mg/kg	0.659	0.1206	18.3	31	0.680	0.0900	0.0271	0.615 - 0.703
Ni	mg/kg	42.1	5.30	12.6	34	42.4	3.55	1.14	40.3 - 43.9
Pb	mg/kg	669	48.4	7.2	34	663	33.0	10.4	652 - 686
Zn	mg/kg	3910	380	9.7	34	3880	267	81	3774 - 4039

Indicative Values SETOC 749

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
acenaphthene	µg/kg	168	64.1	38.3	46	173	44.0	11.8	149 - 187
benzo(ghi)perylene	µg/kg	2250	665	29.5	57	2200	450	110	2075 - 2427
dibenz(ah)anthracene	µg/kg	635	293.7	46.2	54	634	202.5	50.0	555 - 715
fluorene	µg/kg	671	168.0	25.0	51	674	119.3	29.4	624 - 718
naphthalene	µg/kg	323	122.9	38.0	47	327	87.0	22.4	287 - 359

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PCB 028	µg/kg	3.06	1.480	48.4	28	3.10	1.085	0.350	2.48 - 3.63
PCB 101	µg/kg	34.6	8.67	25.1	40	35.0	6.00	1.71	31.8 - 37.3
PCB 153	µg/kg	70.6	18.25	25.9	41	70.1	12.40	3.56	64.8 - 76.3
PCB 180	µg/kg	44.3	11.70	26.4	41	45.0	8.00	2.28	40.6 - 48.0

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
o,p`-DDD	µg/kg	15.4	5.44	35.3	15	16.0	4.00	1.76	12.4 - 18.4
o,p`-DDT	µg/kg	7.86	3.223	41.0	11	8.00	2.130	1.215	5.72 - 10.00
p,p`-DDD	µg/kg	58.9	22.61	38.4	19	54.3	15.50	6.48	48.0 - 69.7
p,p`-DDE	µg/kg	32.0	10.41	32.6	19	34.4	7.50	2.99	27.0 - 37.0

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
EOX	mg/kg	2.55	1.001	39.3	19	2.55	0.670	0.287	2.06 - 3.03
Mineral oil, GC	mg/kg	627	194.5	31.0	23	627	127.0	50.7	543 - 711
Mineral oil, IR	mg/kg	801	248.5	31.0	21	815	162.0	67.8	689 - 914
Particles < 2 µm	%	22.8	1.20	5.3	10	22.6	0.90	0.48	21.9 - 23.6

Informative Values SETOC 749

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Median	MAD	N	Results smaller than (<) Median of <	N
acenaphthylene	µg/kg	297	119.0	36	500	13

Method: Polychlorobiphenyls

Element	Unit	Median	MAD	N
PCB 128	µg/kg	8.12	1.235	6
PCB 149	µg/kg	56.7	3.30	7
PCB 156	µg/kg	6.52	2.150	6

Method: Organochlorine pesticides

Element	Unit	Median	MAD	N	Results smaller than (<) Median of <	N
alpha-HCH	µg/kg	1.47	0.465	4	5.00	19
beta-HCH	µg/kg	4.71	0.750	4	5.00	19
dieldrin	µg/kg	3.00	0.300	5	5.00	16
endrin	µg/kg	2.20	0.140	3	5.00	18
heptachlor	µg/kg	-	-	0	5.00	21
hexachlorobenzene	µg/kg	2.60	0.160	7	5.00	17
o,p`-DDE	µg/kg	3.89	2.790	4	5.00	16
pentachlorobenzene	µg/kg	-	-	0	5.00	12

Method: Other parameters

Element	Unit	Median	MAD	N	Results smaller than (<) Median of <	N
AOX	mg/kg	106	16.0	4		
CN - Total	mg/kg	1.20	0.490	8	2.15	8
Organic carbon	g/kg	61.4	5.85	6		
Particles < 63 µm	%	75.9	3.80	3		