WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Manure and Refuse Sample Exchange Program

REFERENCE MATERIAL

MARSEP sample 263

WAGENINGEN
UNIVERSITY & RESEARCH

marsep

Certificate of Analysis MARSEP 263

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.

All values, expressed on a weight basis (kg or %), are reported as oven-dried (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 MARSEP samples are dried at 40°C and milled to pass a 0.5 mm sieve.

This MARSEP sample 263 of Compost, from Switzerland, is prepared for the WEPAL proficiency programs. The sample has been used in 16 periods (or rounds). Only results from the last 5 periods are used. This way, the consensus values reflect the latest 'state of the art' analytical techniques used by the laboratories.It also gives a better estimate of the concentrations of non-stable or volatile determinands. The results on which the values in this report are based were taken from the periods given in the following table:

Year	Round	Number
2024	4	2
2022	3	3
2019	4	1
2019	3	2
2019	2	3

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Consensus Values MARSEP 263

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	13.4	3.61	26.9	55	13.7	2.00	0.609	4.54
As	mg/kg	8.85	0.648	7.3	56	8.77	0.380	0.108	1.22
B	mg/kg	19.5	5.88	30.1	44	20.4	4.45	1.11	5.67
Ba	mg/kg	95.4	17.1	18.0	26	94.5	11.2	4.20	4.40
Be	µg/kg	623	81.8	13.1	17	630	43.7	24.8	3.98
Ca	g/kg	48.5	2.51	5.2	111	48.3	1.60	0.298	0.615
Cd	mg/kg	0.377	0.031	8.2	107	0.380	0.020	0.004	0.990
Co	mg/kg	7.07	0.659	9.3	92	7.09	0.415	0.086	1.21
Cr	mg/kg	72.2	14.6	20.3	112	72.5	8.83	1.73	2.39
Cu	mg/kg	44.4	3.42	7.7	121	44.7	2.20	0.389	0.876
Fe	g/kg	17.5	1.24	7.1	85	17.4	0.720	0.168	0.965
Hg	µg/kg	92.5	13.7	14.8	87	93.1	7.16	1.84	1.99
K	g/kg	8.36	1.39	16.6	124	8.44	0.820	0.156	1.86
Mg	g/kg	8.40	0.550	6.5	121	8.39	0.345	0.062	0.744
Mn	mg/kg	692	36.7	5.3	80	693	19.7	5.13	0.742
Mo	mg/kg	2.92	0.312	10.7	85	2.90	0.194	0.042	1.45
Na	g/kg	0.600	0.096	16.0	65	0.617	0.057	0.015	2.47
Ni	mg/kg	31.7	2.34	7.4	113	31.7	1.57	0.275	0.866
N	g/kg	9.92	0.423	4.3	117	9.98	0.239	0.049	0.493
P	g/kg	2.36	0.146	6.2	126	2.36	0.090	0.016	0.690
Pb	mg/kg	34.1	3.28	9.6	112	34.0	2.10	0.387	1.14
S - SO4 (as S)	mg/kg	1427	135	9.5	9	1419	53.5	56.3	3.95
Sb	µg/kg	769	120	15.7	19	749	68.4	34.5	4.49
Sr	mg/kg	102	13.7	13.5	12	102	9.12	4.94	4.86
V	mg/kg	34.0	6.98	20.5	35	34.4	4.11	1.47	4.33
Zn	mg/kg	135	9.28	6.9	120	136	5.32	1.06	0.782
S	mg/kg	1476	175	11.9	49	1472	100	31.3	2.12
TC =totalC (org+inorg)	g/kg	135	3.95	2.9	29	134	2.00	0.918	0.681

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
AOX	mg/kg	55.1	5.44	9.9	23	55.3	3.50	1.42	2.57
loss-on-ignition	%	24.0	0.642	2.7	103	24.0	0.400	0.079	0.330
residue-on-ignition	%	75.5	0.991	1.3	11	75.6	0.600	0.374	0.495
dry weight	%	96.6	0.590	0.6	35	96.5	0.300	0.125	0.129

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Indicative Values MARSEP 263

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ag	µg/kg	146	28.0	19.2	12	145	14.0	10.1	6.94
Bi	µg/kg	205	16.2	7.9	5	209	12.0	9.05	4.42
Li	mg/kg	18.6	3.47	18.7	13	18.9	2.89	1.20	6.48
Se	µg/kg	326	220	67.5	21	364	121	60.0	18.4
Sn	mg/kg	3.25	1.03	31.7	20	3.31	0.740	0.288	8.86
Ti	mg/kg	354	192	54.3	10	311	105	76.0	21.5
Tl	µg/kg	55.7	36.2	64.9	6	166	21.3	18.5	33.1
U	mg/kg	0.820	0.029	3.5	4	0.819	0.014	0.018	2.18