WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Manure and Refuse Sample Exchange Program

REFERENCE MATERIAL

MARSEP sample 261

WAGENINGEN
UNIVERSITY & RESEARCH

marsep

Certificate of Analysis MARSEP 261

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 261 of Compost, from Switzerland, is prepared for the WEPAL proficiency programs. The sample has been used in 5 periods (or rounds). The results on which the values in this report are based were taken from the periods given in the following table:

Year	Round	Number
2022	4	3
2020	2	1
2017	3	2
2014	1	2
2011	1	4

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Consensus Values MARSEP 261

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	9.26	2.57	27.8	52	9.43	1.59	0.446	4.82
As	mg/kg	6.27	0.725	11.6	57	6.41	0.496	0.120	1.92
Ba	mg/kg	99.6	9.58	9.6	28	99.9	5.95	2.26	2.27
Be	µg/kg	457	52.6	11.5	18	459	30.0	15.5	3.39
Ca	g/kg	62.4	2.95	4.7	129	62.5	2.04	0.324	0.520
Cd	mg/kg	0.427	0.045	10.6	122	0.430	0.024	0.005	1.20
Co	mg/kg	5.49	0.545	9.9	109	5.44	0.390	0.065	1.19
Cr	mg/kg	88.8	16.5	18.6	133	88.2	9.60	1.79	2.01
Cu	mg/kg	62.4	3.96	6.3	144	61.9	2.50	0.413	0.661
Fe	g/kg	13.5	1.21	8.9	92	13.5	0.705	0.157	1.16
Hg	µg/kg	112	14.6	13.0	99	112	9.30	1.84	1.64
K	g/kg	9.51	1.36	14.3	139	9.39	0.910	0.144	1.52
Li	mg/kg	12.6	0.970	7.7	8	12.6	0.550	0.429	3.40
Mg	g/kg	9.03	0.650	7.2	137	9.00	0.380	0.069	0.769
Mn	mg/kg	541	31.8	5.9	83	538	20.6	4.37	0.807
Mo	mg/kg	2.21	0.382	17.3	102	2.22	0.235	0.047	2.14
Na	g/kg	1.59	0.130	8.2	64	1.59	0.090	0.020	1.28
Ni	mg/kg	38.2	3.46	9.1	130	38.0	2.00	0.380	0.993
N	g/kg	13.1	0.654	5.0	132	13.1	0.445	0.071	0.544
P	g/kg	3.08	0.187	6.1	140	3.10	0.125	0.020	0.642
Pb	mg/kg	51.5	5.18	10.1	133	51.5	3.00	0.562	1.09
Sb	µg/kg	842	178	21.2	18	834	111	52.5	6.23
Sn	mg/kg	3.90	0.718	18.4	18	4.01	0.465	0.212	5.43
Sr	mg/kg	131	4.79	3.7	12	130	3.00	1.73	1.32
V	mg/kg	21.0	5.49	26.1	33	21.1	3.80	1.19	5.68
Zn	mg/kg	159	10.4	6.6	143	159	6.00	1.09	0.686
S	mg/kg	1760	206	11.7	41	1757	117	40.3	2.29
TC =totalC (org+inorg)	g/kg	212	14.7	6.9	26	213	7.50	3.60	1.70

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
AOX	mg/kg	61.8	6.04	9.8	27	61.6	3.50	1.45	2.35
loss-on-ignition	%	37.6	0.858	2.3	114	37.7	0.520	0.100	0.267
residu-on-ignition	%	62.0	1.77	2.9	9	62.0	0.800	0.739	1.19
dry weight	%	95.6	0.613	0.6	16	95.6	0.405	0.191	0.200

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Indicative Values MARSEP 261

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ag	µg/kg	202	16.0	7.9	6	202	14.0	8.16	4.03
B	mg/kg	22.3	6.68	30.0	32	21.4	4.62	1.48	6.63
Bi	µg/kg	198	35.3	17.8	4	198	16.0	22.1	11.1
Se	µg/kg	227	176	77.4	15	250	98.0	56.7	25.0
Ti	mg/kg	176	80.7	46.0	6	188	63.0	41.2	23.5
Tl	µg/kg	80.3	33.5	41.8	6	104	11.0	17.1	21.3