WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Manure and Refuse Sample Exchange Program

REFERENCE MATERIAL

MARSEP sample 280

WAGENINGEN
UNIVERSITY & RESEARCH

marsep

Certificate of Analysis MARSEP 280

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 280 of Champost, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 4 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
2021	4	4
2019	3	3
2017	1	2
2014	1	1

Consensus Values MARSEP 280

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	1.73	0.481	27.7	44	1.78	0.320	0.091	5.23
B	mg/kg	15.8	3.21	20.3	37	15.9	2.20	0.659	4.16
Ba	mg/kg	62.7	6.04	9.6	25	63.3	3.80	1.51	2.41
Be	µg/kg	97.0	11.5	11.9	12	98.5	6.50	4.15	4.28
Ca	g/kg	56.6	2.89	5.1	105	56.5	1.94	0.353	0.623
Cd	mg/kg	0.314	0.038	12.0	98	0.313	0.024	0.005	1.52
Co	mg/kg	1.15	0.183	15.9	88	1.17	0.120	0.024	2.12
Cr	mg/kg	9.74	1.74	17.9	108	9.81	1.10	0.210	2.15
Cu	mg/kg	25.6	2.31	9.0	116	25.7	1.48	0.268	1.05
Fe	g/kg	2.66	0.269	10.1	77	2.70	0.190	0.038	1.44
Hg	µg/kg	48.6	8.46	17.4	74	49.0	5.00	1.23	2.53
K	g/kg	21.7	1.66	7.7	116	21.6	1.05	0.193	0.888
Mg	g/kg	4.16	0.254	6.1	109	4.15	0.164	0.030	0.731
Mn	mg/kg	242	18.2	7.5	68	242	13.0	2.76	1.14
Mo	mg/kg	2.57	0.252	9.8	86	2.56	0.142	0.034	1.32
Na	g/kg	2.43	0.199	8.2	52	2.42	0.130	0.035	1.42
Ni	mg/kg	4.10	0.521	12.7	102	4.16	0.311	0.064	1.57
N	g/kg	19.2	0.778	4.1	109	19.2	0.400	0.093	0.485
P	g/kg	4.87	0.318	6.5	119	4.88	0.190	0.036	0.748
Pb	mg/kg	5.72	0.858	15.0	99	5.80	0.500	0.108	1.89
Sr	mg/kg	230	9.98	4.3	11	232	9.00	3.76	1.63
V	mg/kg	5.59	1.06	19.0	30	5.69	0.560	0.242	4.33
Zn	mg/kg	125	9.67	7.8	115	124	6.00	1.13	0.905
S	mg/kg	21833	2823	12.9	40	21935	1805	558	2.56
TC =totalC (org+inorg)	g/kg	300	22.6	7.5	22	300	12.0	6.02	2.01

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
AOX	mg/kg	580	44.1	7.6	23	580	24.0	11.5	1.98
loss-on-ignition	%	57.3	1.05	1.8	93	57.4	0.735	0.136	0.237
dry weight	%	92.1	0.682	0.7	14	92.1	0.390	0.228	0.247

Indicative Values MARSEP 280

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ag	µg/kg	18.0	6.37	35.4	5	18.6	2.86	3.56	19.8
As	mg/kg	1.62	0.532	32.8	41	1.65	0.340	0.104	6.40
Li	mg/kg	2.22	0.426	19.2	8	2.26	0.215	0.188	8.47
S - SO4 (as S)	mg/kg	21172	3357	15.9	5	22415	1487	1877	8.86
Sb	µg/kg	186	76.8	41.3	18	208	41.7	22.6	12.2
Se	µg/kg	411	206	50.2	19	418	104	59.2	14.4
Sn	mg/kg	0.410	0.098	23.9	11	0.410	0.048	0.037	8.99
Ti	mg/kg	63.2	38.3	60.6	7	54.6	19.4	18.1	28.7
Tl	µg/kg	34.1	9.66	28.3	6	34.4	3.80	4.93	14.5

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
residu-on-ignition	%	43.2	1.54	3.6	5	43.3	0.900	0.861	1.99