WEPAL-QUASIMEME

Certificate of Analysis

International Manure and Refuse Sample Exchange Program

REFERENCE MATERIAL

MARSEP sample 296

2026-Jul-30

WAGENINGEN
UNIVERSITY & RESEARCH

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Certificate of Analysis MARSEP 296

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 measurand 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.

Please note: Most WEPAL-QUASIMEME reference materials are found to be stable over the long term (>10 years) for most measurand/matrix combinations. There are a few exceptions known to us as being less stable over the long term. These are organotins in sediment (MS6), ASP in shellfish (BT7), some PAHs and PCBs in sediment (SETOC) and N-NH_4 (as N) & N-NO_3 (as N) in clay soils (ISE).

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 296 of chicken manure, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 3 rounds. The results on which the values in this report are based were taken from the rounds given in the following table:

Year	Round	Number
2026	2	1
2025	2	3
2023	1	1

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Consensus Values MARSEP 296

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	0.625	0.152	24.3	38	0.648	0.101	0.031	4.92
As	mg/kg	0.471	0.092	19.6	21	0.486	0.062	0.025	5.35
B	mg/kg	29.1	4.78	16.4	27	29.5	2.89	1.15	3.94
Ba	mg/kg	15.1	0.755	5.0	17	15.0	0.395	0.229	1.52
Ca	g/kg	56.6	3.59	6.3	66	56.9	2.34	0.553	0.977
Cd	mg/kg	0.273	0.042	15.4	64	0.275	0.026	0.007	2.40
Co	mg/kg	0.873	0.103	11.8	46	0.884	0.065	0.019	2.18
Cr	mg/kg	3.47	0.578	16.7	61	3.51	0.360	0.093	2.67
Cu	mg/kg	73.2	4.81	6.6	69	73.3	2.78	0.724	0.989
Fe	g/kg	1.31	0.126	9.6	52	1.33	0.083	0.022	1.66
K	g/kg	20.7	1.25	6.1	75	20.7	0.665	0.181	0.875
Mg	g/kg	7.83	0.376	4.8	70	7.82	0.220	0.056	0.717
Mn	mg/kg	386	27.0	7.0	53	384	17.1	4.63	1.20
Mo	mg/kg	2.45	0.189	7.7	51	2.44	0.114	0.033	1.35
Na	g/kg	3.90	0.250	6.4	47	3.95	0.150	0.046	1.17
Ni	mg/kg	5.45	0.558	10.2	66	5.52	0.380	0.086	1.58
N	g/kg	43.5	1.22	2.8	68	43.5	0.800	0.186	0.427
P	g/kg	13.6	0.714	5.3	75	13.6	0.372	0.103	0.760
Pb	mg/kg	1.42	0.236	16.6	57	1.41	0.130	0.039	2.75
Sb	µg/kg	68.0	7.30	10.7	9	70.5	4.74	3.04	4.48
Se	µg/kg	1019	118	11.5	19	1022	77.6	33.7	3.31
Sr	mg/kg	61.9	7.43	12.0	9	62.6	4.80	3.10	5.00
V	mg/kg	2.21	0.285	12.9	21	2.18	0.160	0.078	3.52
Zn	mg/kg	369	24.5	6.6	70	368	17.8	3.66	0.993
S	mg/kg	5486	566	10.3	36	5446	345	118	2.15
TC =totalC (org+inorg)	g/kg	381	16.9	4.4	22	379	10.6	4.51	1.18
Tl	µg/kg	68.8	5.43	7.9	8	69.2	2.40	2.40	3.49
U	mg/kg	0.512	0.028	5.4	10	0.516	0.011	0.011	2.12

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
loss-on-ignition	%	76.0	0.614	0.8	47	76.0	0.400	0.112	0.147
dry weight	%	93.1	0.421	0.5	31	93.2	0.350	0.094	0.101

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Indicative Values MARSEP 296

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ag	µg/kg	10.9	2.03	18.7	4	10.8	0.923	1.27	11.7
Be	µg/kg	47.1	7.57	16.0	5	48.1	3.19	4.23	8.97
Hg	µg/kg	12.2	5.55	45.4	38	12.6	3.03	1.13	9.20
Li	mg/kg	2.12	0.276	13.0	7	2.09	0.130	0.131	6.16
Sn	mg/kg	0.185	0.071	38.3	8	0.209	0.054	0.031	16.9
TOC =total org.C	g/kg	385	55.5	14.4	4	383	26.5	34.7	9.02
OC = org.C	g/kg	393	88.9	22.6	5	393	52.9	49.7	12.6

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
AOX	mg/kg	31.3	6.06	19.4	8	31.0	3.05	2.68	8.56
residue-on-ignition	%	23.7	0.983	4.1	6	23.8	0.400	0.502	2.12