WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 173

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis IPE 173

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 IPE samples are dried at 70 ºC and milled to pass a 0.5 mm sieve.

This IPE sample 173 of Virginia Creeper / Parthenocissus quinquefolia from Netherlands is prepared for the WEPAL proficiency programs. The sample is used in 3 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
2019	4	2
2014	4	3
2010	4	4

Consensus Values IPE 173

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
B	mg/kg	25.1	2.02	8.0	212	25.0	1.40	0.17	24.86 - 25.41
Ba	mg/kg	8.31	0.626	7.5	30	8.37	0.436	0.143	8.08 - 8.55
Ca	g/kg	14.2	0.86	6.1	314	14.2	0.60	0.06	14.09 - 14.28
Cd	µg/kg	18.4	3.08	16.7	46	18.9	2.20	0.57	17.5 - 19.3
Cl (as Cl)	g/kg	0.522	0.1162	22.3	51	0.550	0.0800	0.0203	0.489 - 0.554
Cr	µg/kg	503	122.3	24.3	50	526	85.7	21.6	469 - 538
Cu	mg/kg	8.31	0.757	9.1	292	8.38	0.525	0.055	8.22 - 8.39
Fe	mg/kg	104	10.2	9.8	284	105	7.1	0.8	103.1 - 105.5
Hg	µg/kg	10.3	1.14	11.1	30	10.4	0.80	0.26	9.88 - 10.7
K	g/kg	14.2	0.86	6.0	317	14.2	0.60	0.06	14.11 - 14.30
Mg	g/kg	1.16	0.082	7.0	317	1.16	0.058	0.006	1.15 - 1.17
Mn	mg/kg	57.8	3.96	6.9	297	57.7	2.70	0.29	57.4 - 58.3
Mo	µg/kg	254	36.4	14.3	66	260	25.6	5.6	245 - 263
N - Kjeldahl (as N)	g/kg	15.7	0.74	4.7	203	15.6	0.50	0.06	15.55 - 15.76
N - NO3 (as N)	mg/kg	126	19.6	15.5	19	131	13.1	5.6	117 - 136
Na	mg/kg	125	23.6	18.9	178	124	16.2	2.2	121.6 - 128.6
Ni	µg/kg	525	96.3	18.4	48	540	69.2	17.4	497 - 553
P (as P)	g/kg	2.71	0.147	5.4	313	2.71	0.100	0.010	2.69 - 2.73
Pb	µg/kg	2100	245	11.7	74	2070	171	36	2043 - 2156
Rb	µg/kg	16800	940	5.6	16	16600	640	290	16300 - 17290
S (as S)	g/kg	1.22	0.114	9.4	179	1.22	0.080	0.011	1.20 - 1.23
Sb	µg/kg	59.3	10.30	17.4	19	60.9	7.47	2.95	54.4 - 64.3
Se	µg/kg	266	56.9	21.3	36	262	40.0	11.8	247 - 286
Sr	mg/kg	36.7	2.24	6.1	32	36.6	1.50	0.50	35.9 - 37.5
V	µg/kg	227	26.7	11.8	23	230	20.0	7.0	216 - 239
Zn	mg/kg	24.2	2.16	8.9	294	24.3	1.50	0.16	23.98 - 24.48

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
C - elementary	g/kg	464	10.9	2.3	93	464	7.5	1.4	462.0 - 466.5
N - elementary	g/kg	16.5	0.67	4.1	144	16.5	0.47	0.07	16.39 - 16.61

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Al	mg/kg	46.1	10.99	23.9	56	46.0	7.68	1.84	43.1 - 49.0

Consensus Values IPE 173

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Crude fibre	g/kg	251	28.4	11.3	19	246	19.4	8.1	237 - 264
Total ash	g/kg	67.8	2.99	4.4	35	67.7	2.28	0.63	66.8 - 68.9

Indicative Values IPE 173

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
As	µg/kg	87.9	25.35	28.9	40	89.0	18.19	5.01	79.8 - 96.0
Co	µg/kg	48.4	13.02	26.9	53	48.9	9.01	2.24	44.8 - 52.0
I	µg/kg	308	31.3	10.2	8	315	22.8	13.8	282 - 334
N - NH4 (as N)	mg/kg	433	124.3	28.7	8	443	93.9	54.9	331 - 534
Sn	µg/kg	78.6	17.61	22.4	10	79.0	11.95	6.96	66.2 - 91.0

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Al	mg/kg	70.7	25.08	35.5	37	72.0	16.97	5.15	62.3 - 79.0

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
delta 13C	‰ V-PDB	-29.4	0.17	0.6	10	-29.3	0.12	0.07	-29.49 - -29.25
delta 15N	‰ Air	2.97	0.214	7.2	9	3.00	0.150	0.089	2.81 - 3.14

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
ADF-ash-free	g/kg	388	55.5	14.3	11	387	38.6	20.9	352 - 425
NDF-ash-free	g/kg	505	67.8	13.4	10	493	47.0	26.8	457 - 553

Informative Values IPE 173

Method: Inorganic Chemical Composition

Element	Unit	Median	MAD	N	Results smaller than (<) Median of <	N
Ag	µg/kg	8.96	3.840	4		
Be	µg/kg	3.75	0.345	4	30.00	12
Bi	µg/kg	5.33	1.250	5		
Br	mg/kg	3.90	0.550	7		
Cs	µg/kg	12.8	11.80	5		
Li	µg/kg	83.4	38.60	11	300.0	5
SO4 (as SO4)	g/kg	0.430	0.2210	7		
Ti	mg/kg	2.30	1.400	8	8.13	6

Method: Real totals

Element	Unit	Median	MAD	N
Si	mg/kg	2110	642	6

Method: Acid extractable (So-called totals)

Element	Unit	Median	MAD	N
Si	mg/kg	497	496.4	5

Method: Nutritional values

Element	Unit	Median	MAD	N
Total fat	g/kg	25.0	9.46	12