WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 169

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis IPE 169

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

This IPE sample 169 of Leek / Allium porrum, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been 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	2	1
2015	4	3
2011	4	1

Consensus Values IPE 169

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	19.7	1.90	9.7	224	19.8	1.25	0.159	0.806
Cu	mg/kg	5.26	0.622	11.8	288	5.30	0.390	0.046	0.870
Fe	mg/kg	91.1	10.00	11.0	292	91.8	6.68	0.731	0.803
Mn	mg/kg	75.3	5.47	7.3	300	75.3	3.43	0.394	0.524
Zn	mg/kg	169	15.0	8.9	298	169	9.66	1.09	0.643
As	µg/kg	99.4	16.0	16.1	57	99.9	9.88	2.65	2.66
Br	mg/kg	10.6	1.09	10.3	9	10.6	0.810	0.453	4.27
Cd	µg/kg	3545	371	10.5	104	3547	254	45.5	1.28
Co	µg/kg	44.9	9.96	22.2	68	45.4	5.43	1.51	3.36
Cr	µg/kg	395	135	34.1	72	407	93.9	19.9	5.02
Hg	µg/kg	14.4	2.44	16.9	40	14.5	1.42	0.481	3.34
Mo	µg/kg	864	98.2	11.4	95	865	65.1	12.6	1.46
Ni	µg/kg	341	113	33.1	59	358	79.6	18.4	5.39
Pb	µg/kg	834	120	14.4	83	831	69.0	16.5	1.97
Se	µg/kg	39.6	12.5	31.5	40	40.3	6.45	2.46	6.22
Ba	mg/kg	4.28	0.412	9.6	36	4.24	0.275	0.086	2.01
V	µg/kg	163	32.2	19.8	27	157	18.4	7.74	4.76
Sr	mg/kg	15.6	1.45	9.3	37	15.9	1.05	0.297	1.90
Rb	µg/kg	11519	1337	11.6	26	11580	776	328	2.85
Ca	g/kg	7.68	0.551	7.2	319	7.65	0.340	0.039	0.503
Cl (as Cl)	g/kg	5.49	0.358	6.5	65	5.50	0.220	0.055	1.01
K	g/kg	33.8	2.52	7.5	328	33.7	1.61	0.174	0.516
Mg	g/kg	2.41	0.168	7.0	320	2.40	0.110	0.012	0.488
N - Kjeldahl (as N)	g/kg	27.7	1.31	4.7	193	27.6	0.850	0.118	0.425
N - NO3 (as N)	mg/kg	671	70.5	10.5	26	672	40.0	17.3	2.57
Na	mg/kg	382	49.1	12.9	197	383	29.0	4.37	1.14
P (as P)	g/kg	3.46	0.235	6.8	322	3.46	0.151	0.016	0.472
S (as S)	g/kg	5.07	0.518	10.2	183	5.05	0.326	0.048	0.943
SO4 (as SO4)	g/kg	2.72	0.425	15.6	11	2.75	0.240	0.160	5.90

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	435	15.3	3.5	112	434	10.1	1.80	0.415
N - elementary	g/kg	29.6	1.24	4.2	164	29.5	0.800	0.121	0.409

Consensus Values IPE 169

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	45.3	8.00	17.7	61	45.0	4.55	1.28	2.83

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-28.8	0.312	1.1	22	-28.8	0.200	0.083	0.290
delta 15N	‰ Air	500	15.6	3.1	20	500	10.8	4.36	0.873

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	129	8.86	6.9	18	129	5.45	2.61	2.02
ADF-ash-free	g/kg	176	21.3	12.1	12	172	14.9	7.69	4.36
NDF-ash-free	g/kg	209	32.9	15.7	11	206	34.0	12.4	5.92
Total ash	g/kg	99.5	5.26	5.3	33	100	2.62	1.14	1.15

Indicative Values IPE 169

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ga	µg/kg	20.7	7.61	36.7	5	23.0	3.33	4.25	20.5
I	µg/kg	128	108	84.6	11	147	67.0	40.6	31.9
Li	µg/kg	164	57.7	35.2	16	168	28.0	18.0	11.0
Sb	µg/kg	20.8	11.9	57.3	28	22.8	6.45	2.81	13.5
Sn	µg/kg	60.5	37.8	62.5	16	72.5	30.4	11.8	19.5
Ti	mg/kg	1.82	1.15	63.0	15	2.11	0.980	0.370	20.3
Ag	µg/kg	7.63	2.28	29.9	7	7.81	1.23	1.08	14.1
Cs	µg/kg	12.0	6.00	50.0	11	13.4	3.93	2.26	18.8
N - NH4 (as N)	mg/kg	497	665	133.7	9	605	394	277	55.7

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	70.8	25.7	36.3	40	75.7	18.1	5.08	7.18
Si	mg/kg	1404	565	40.3	7	1409	291	267	19.0

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total fat	g/kg	30.2	11.4	37.8	11	30.4	5.70	4.29	14.2