WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 179

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis IPE 179

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 179 of Tomato (plant) / Solanum lycopersicum L., 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
2024	4	1
2022	1	3
2018	2	4
2013	3	1

Consensus Values IPE 179

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	51.5	4.63	9.0	307	51.4	2.97	0.330	0.642
Cu	mg/kg	9.60	1.01	10.5	384	9.60	0.607	0.065	0.673
Fe	mg/kg	174	21.1	12.1	372	174	12.6	1.37	0.785
Mn	mg/kg	204	14.7	7.2	378	204	9.08	0.945	0.463
Zn	mg/kg	88.8	6.95	7.8	378	88.4	4.51	0.447	0.503
As	µg/kg	85.4	12.6	14.7	69	86.0	7.49	1.89	2.22
Cd	µg/kg	352	44.6	12.7	120	351	26.1	5.08	1.44
Co	µg/kg	382	56.2	14.7	92	384	32.7	7.33	1.92
Cr	µg/kg	8770	1186	13.5	95	8789	827	152	1.73
Hg	µg/kg	25.1	2.95	11.8	56	25.1	1.69	0.493	1.96
I	µg/kg	299	23.0	7.7	12	301	14.0	8.31	2.78
Li	µg/kg	579	111	19.1	20	584	64.6	31.0	5.35
Mo	µg/kg	2066	217	10.5	118	2080	121	24.9	1.21
Ni	µg/kg	524	126	24.0	73	537	72.5	18.4	3.52
Pb	µg/kg	838	130	15.5	105	840	91.7	15.9	1.90
Ba	mg/kg	4.68	0.440	9.4	36	4.80	0.330	0.092	1.96
Sb	µg/kg	72.9	12.1	16.6	26	70.6	8.19	2.98	4.08
V	µg/kg	169	28.7	17.0	25	169	18.0	7.19	4.24
Sr	mg/kg	22.5	1.17	5.2	31	22.6	0.800	0.263	1.17
Rb	µg/kg	5821	457	7.8	12	5859	266	165	2.83
Ca	g/kg	18.8	1.33	7.0	401	18.8	0.800	0.083	0.440
Cl (as Cl)	g/kg	3.01	0.365	12.1	69	3.00	0.190	0.055	1.82
K	g/kg	38.2	2.58	6.8	415	38.2	1.70	0.158	0.414
Mg	g/kg	5.52	0.375	6.8	408	5.52	0.229	0.023	0.421
N - Kjeldahl (as N)	g/kg	24.1	1.44	6.0	260	24.1	0.960	0.112	0.465
N - NO3 (as N)	mg/kg	3943	265	6.7	29	3980	140	61.4	1.56
Na	mg/kg	849	79.5	9.4	240	848	48.0	6.42	0.756
P (as P)	g/kg	7.11	0.523	7.4	411	7.10	0.330	0.032	0.454
S (as S)	g/kg	10.5	1.10	10.4	241	10.5	0.680	0.088	0.838

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	406	16.1	4.0	139	406	10.0	1.71	0.420
Al	mg/kg	92.9	25.3	27.3	51	96.2	16.7	4.43	4.77
N - elementary	g/kg	26.7	1.01	3.8	196	26.7	0.600	0.091	0.339

Consensus Values IPE 179

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	75.1	15.1	20.1	75	74.6	9.73	2.18	2.90

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-30.8	0.184	0.6	24	-30.8	0.090	0.047	0.152

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	209	16.8	8.0	27	211	10.0	4.04	1.93
ADF-ash-free	g/kg	270	37.9	14.0	16	271	27.5	11.8	4.38
NDF-ash-free	g/kg	340	44.7	13.2	15	343	27.5	14.4	4.25
Total ash	g/kg	148	5.92	4.0	54	148	3.60	1.01	0.682

Indicative Values IPE 179

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
F	mg/kg	3.42	1.90	55.4	4	3.55	1.00	1.19	34.6
Se	µg/kg	25.0	15.8	63.2	34	26.0	9.99	3.39	13.6
Sn	µg/kg	11788	4207	35.7	23	12160	2978	1096	9.30
Ti	mg/kg	2.56	1.94	75.8	13	2.24	1.07	0.673	26.3
Ag	µg/kg	4.90	3.20	65.3	7	5.93	1.93	1.51	30.9
Be	µg/kg	20.9	3.79	18.2	12	21.5	1.90	1.37	6.55
Cs	µg/kg	69.4	3.04	4.4	5	70.4	1.61	1.70	2.45
N - NH4 (as N)	mg/kg	323	314	97.3	9	423	203	131	40.5
SO4 (as SO4)	g/kg	22.1	9.23	41.7	9	25.0	6.72	3.84	17.4

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Si	mg/kg	635	560	88.2	8	723	482	247	39.0

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Si	mg/kg	279	387	138.5	12	306	242	140	50.0

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 15N	‰ Air	0.515	0.198	38.5	24	0.540	0.131	0.051	9.83

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
NDF-ash-containing	g/kg	343	50.0	14.6	4	342	24.0	31.3	9.10
Total fat	g/kg	26.1	10.6	40.5	23	25.8	5.70	2.75	10.6