WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 181

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis IPE 181

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 181 of Mango (leaf) / Mangifera indica, from Senegal, 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
2019	1	3
2014	2	1
2010	1	2
2007	2	3

Consensus Values IPE 181

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	31.1	3.59	11.6	334	31.0	2.30	0.246	0.790
Cu	mg/kg	4.49	0.789	17.6	433	4.52	0.494	0.047	1.06
Fe	mg/kg	266	29.4	11.1	431	265	18.0	1.77	0.666
Mn	mg/kg	650	56.5	8.7	444	647	33.7	3.35	0.516
Zn	mg/kg	17.3	1.94	11.2	438	17.4	1.12	0.116	0.668
Cd	µg/kg	30.6	6.06	19.8	96	30.5	3.52	0.773	2.53
Co	µg/kg	201	30.4	15.1	94	202	17.7	3.92	1.95
Cr	µg/kg	735	172	23.4	112	736	111	20.3	2.76
Hg	µg/kg	32.0	3.10	9.7	77	32.0	1.98	0.441	1.38
Li	µg/kg	369	66.4	18.0	23	365	36.0	17.3	4.70
Mo	µg/kg	226	50.3	22.3	106	233	32.2	6.10	2.71
Ni	µg/kg	1392	191	13.7	112	1400	110	22.5	1.62
Pb	µg/kg	668	96.2	14.4	126	672	53.5	10.7	1.60
Se	µg/kg	273	91.9	33.7	55	281	55.7	15.5	5.68
Ba	mg/kg	46.6	4.25	9.1	49	45.8	2.78	0.758	1.63
V	µg/kg	629	75.6	12.0	42	630	39.0	14.6	2.32
Sr	mg/kg	57.7	4.33	7.5	51	58.0	2.70	0.757	1.31
Be	µg/kg	29.6	5.24	17.7	23	30.0	2.10	1.37	4.61
Cs	µg/kg	238	16.0	6.7	8	243	10.0	7.05	2.96
Rb	µg/kg	18005	1254	7.0	16	17769	890	392	2.18
Ca	g/kg	20.7	1.46	7.0	466	20.7	0.900	0.084	0.408
Cl (as Cl)	g/kg	1.14	0.200	17.5	85	1.15	0.119	0.027	2.38
K	g/kg	6.65	0.564	8.5	479	6.65	0.350	0.032	0.484
Mg	g/kg	1.77	0.130	7.3	477	1.77	0.080	0.007	0.419
N - Kjeldahl (as N)	g/kg	13.5	0.838	6.2	302	13.5	0.515	0.060	0.446
Na	mg/kg	382	47.1	12.3	277	382	27.7	3.54	0.926
P (as P)	g/kg	0.913	0.065	7.2	479	0.913	0.042	0.004	0.409
S (as S)	g/kg	1.30	0.122	9.4	272	1.30	0.070	0.009	0.713

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	468	14.1	3.0	146	466	8.57	1.45	0.311
Al	mg/kg	520	60.0	11.5	37	512	41.1	12.3	2.37
N - elementary	g/kg	14.0	0.634	4.5	215	14.0	0.420	0.054	0.385

Consensus Values IPE 181

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	454	72.5	16.0	98	452	50.9	9.16	2.02

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-28.3	0.431	1.5	19	-28.4	0.270	0.123	0.436
delta 15N	‰ Air	5.16	0.768	14.9	19	5.20	0.310	0.220	4.27

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	236	41.8	17.7	22	235	24.3	11.1	4.71
ADF-ash-free	g/kg	289	25.9	9.0	8	287	17.3	11.4	3.96
Total ash	g/kg	101	5.89	5.8	45	100	3.57	1.10	1.09

Indicative Values IPE 181

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	µg/kg	77.6	41.1	52.9	68	79.3	26.0	6.23	8.02
I	µg/kg	1177	280	23.8	12	1154	159	101	8.59
Bi	µg/kg	2.54	1.39	54.7	6	2.85	0.700	0.707	27.9
Sb	µg/kg	7.43	4.76	64.1	22	7.68	3.43	1.27	17.1
Sn	µg/kg	37.1	23.5	63.4	20	37.5	11.1	6.58	17.7
Ti	mg/kg	8.57	6.99	81.5	21	10.5	5.00	1.91	22.2
Ag	µg/kg	9.38	6.07	64.7	8	9.35	3.79	2.68	28.6
N - NH4 (as N)	mg/kg	82.4	45.7	55.4	15	91.9	25.9	14.7	17.9
N - NO3 (as N)	mg/kg	11.6	8.58	74.1	22	15.3	6.07	2.29	19.7
SO4 (as SO4)	g/kg	0.495	0.333	67.2	12	0.545	0.224	0.120	24.3

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Si	mg/kg	15094	723	4.8	6	15143	438	369	2.45

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Si	mg/kg	1674	2050	122.5	9	1660	1171	854	51.0

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
NDF-ash-free	g/kg	407	61.7	15.2	8	406	51.9	27.3	6.70
Total fat	g/kg	38.7	25.7	66.4	17	45.1	13.9	7.80	20.1