WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 243

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis IPE 243

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 243 of Mango (leaf) / Mangifera indica, from Ecuador, is prepared for the WEPAL proficiency programs. The sample has been used in 2 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	1	3
2021	1	4

Consensus Values IPE 243

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	137	17.7	12.9	165	136	12.6	1.72	1.25
Cu	mg/kg	2.99	0.606	20.3	184	3.04	0.360	0.056	1.87
Fe	mg/kg	113	13.6	12.1	194	113	9.16	1.22	1.08
Mn	mg/kg	685	57.9	8.5	194	685	37.4	5.20	0.759
Zn	mg/kg	28.1	2.55	9.1	197	28.2	1.51	0.227	0.811
As	µg/kg	121	17.2	14.2	47	120	10.0	3.14	2.60
Cd	µg/kg	70.9	6.65	9.4	55	70.2	3.94	1.12	1.58
Co	µg/kg	76.8	12.2	15.8	50	77.0	6.94	2.15	2.80
Hg	µg/kg	16.9	3.09	18.3	36	16.8	1.81	0.644	3.81
Li	µg/kg	1120	171	15.3	15	1094	142	55.2	4.93
Ni	µg/kg	1090	160	14.7	43	1070	102	30.4	2.79
Pb	µg/kg	111	31.1	28.1	49	113	20.3	5.56	5.01
Ba	mg/kg	60.2	3.77	6.3	18	59.3	2.43	1.11	1.84
V	µg/kg	304	44.2	14.5	13	305	25.8	15.3	5.03
Sr	mg/kg	180	32.1	17.9	16	172	16.8	10.0	5.59
Ca	g/kg	28.8	1.98	6.9	200	28.7	1.15	0.175	0.608
K	g/kg	10.9	0.825	7.6	210	10.9	0.483	0.071	0.652
Mg	g/kg	1.89	0.120	6.3	203	1.90	0.075	0.011	0.557
N - Kjeldahl (as N)	g/kg	14.1	0.669	4.8	119	14.0	0.460	0.077	0.545
Na	mg/kg	203	26.4	13.0	130	203	15.7	2.89	1.42
P (as P)	g/kg	1.08	0.082	7.6	208	1.09	0.050	0.007	0.658
S (as S)	g/kg	1.32	0.141	10.7	136	1.32	0.078	0.015	1.15

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	460	11.1	2.4	76	459	6.70	1.58	0.345
N - elementary	g/kg	14.4	0.485	3.4	107	14.4	0.300	0.059	0.406

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	92.9	14.7	15.9	44	91.4	10.3	2.78	2.99

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-28.0	0.294	1.0	10	-28.0	0.180	0.116	0.415
delta 15N	‰ Air	3.89	0.286	7.4	9	3.88	0.160	0.119	3.07

Consensus Values IPE 243

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	228	15.8	7.0	14	228	7.12	5.29	2.32
ADF-ash-free	g/kg	333	22.7	6.8	9	329	11.5	9.47	2.84
Total ash	g/kg	128	3.16	2.5	32	128	1.97	0.698	0.547

Indicative Values IPE 243

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cr	µg/kg	192	70.5	36.7	37	198	44.8	14.5	7.53
I	µg/kg	599	27.0	4.5	6	592	15.0	13.8	2.30
Mo	µg/kg	58.1	28.5	49.1	40	60.1	18.5	5.64	9.70
Se	µg/kg	64.2	28.4	44.3	32	70.9	17.1	6.28	9.79
Sb	µg/kg	5.17	4.74	91.7	8	5.48	1.90	2.09	40.5
Ti	mg/kg	5.23	1.44	27.6	6	5.03	0.780	0.735	14.1
Rb	µg/kg	3279	237	7.2	7	3273	176	112	3.42
Cl (as Cl)	g/kg	0.697	0.245	35.1	35	0.738	0.128	0.052	7.42
N - NO3 (as N)	mg/kg	13.9	12.4	89.6	8	18.2	6.44	5.50	39.6

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	133	43.4	32.7	24	134	29.1	11.1	8.33
Si	mg/kg	15377	785	5.1	5	15317	583	439	2.85

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
NDF-ash-free	g/kg	414	64.3	15.5	9	400	41.3	26.8	6.48
Total fat	g/kg	29.0	13.5	46.4	17	30.0	9.00	4.09	14.1