



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 234



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 234 of Banana (leaf) / Musa sp., 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
2020	4	4
2017	1	1



Consensus Values IPE 234



Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	28.2	2.68	9.5	152	28.2	1.70	0.272	0.965
Cu	mg/kg	8.66	0.977	11.3	196	8.70	0.700	0.087	1.01
Fe	mg/kg	184	19.0	10.4	195	184	11.7	1.71	0.927
Mn	mg/kg	597	44.5	7.5	195	595	27.7	3.98	0.667
Zn	mg/kg	25.9	2.00	7.7	192	25.9	1.11	0.181	0.698
Cd	µg/kg	91.0	17.7	19.4	52	93.1	10.0	3.06	3.37
Co	µg/kg	144	22.9	15.9	42	147	13.4	4.42	3.07
Cr	µg/kg	536	115	21.5	38	549	74.1	23.4	4.36
Hg	µg/kg	15.7	2.23	14.3	24	15.7	1.45	0.570	3.64
Mo	µg/kg	565	69.9	12.4	52	570	40.0	12.1	2.14
Ni	µg/kg	1610	231	14.4	40	1625	144	45.7	2.84
Se	µg/kg	161	38.0	23.6	30	163	29.1	8.67	5.39
Ba	mg/kg	14.2	0.973	6.9	22	14.3	0.649	0.259	1.83
V	µg/kg	473	57.9	12.2	18	465	42.2	17.1	3.61
Sr	mg/kg	34.0	1.91	5.6	19	33.9	1.00	0.549	1.62
Rb	µg/kg	4763	423	8.9	10	4815	242	167	3.51
Ca	g/kg	7.93	0.580	7.3	202	7.92	0.349	0.051	0.643
Cl (as Cl)	g/kg	12.2	1.05	8.6	33	12.3	0.550	0.229	1.87
K	g/kg	35.1	2.74	7.8	212	35.0	1.62	0.235	0.671
Mg	g/kg	3.55	0.213	6.0	203	3.55	0.135	0.019	0.525
N - Kjeldahl (as N)	g/kg	25.7	1.27	4.9	131	25.7	0.820	0.138	0.540
N - NO3 (as N)	mg/kg	47.4	7.29	15.4	11	48.4	4.62	2.75	5.79
Na	mg/kg	69.6	27.6	39.6	99	74.3	18.4	3.47	4.98
P (as P)	g/kg	1.73	0.108	6.2	210	1.73	0.071	0.009	0.538
S (as S)	g/kg	2.04	0.188	9.2	121	2.04	0.121	0.021	1.05

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	455	11.4	2.5	69	455	6.00	1.71	0.375
N - elementary	g/kg	26.8	0.917	3.4	98	26.8	0.525	0.116	0.431

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	101	24.3	23.9	42	104	17.6	4.69	4.62



Consensus Values IPE 234



Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-27.1	0.163	0.6	9	-27.1	0.089	0.068	0.251
delta 15N	‰ Air	5.02	0.139	2.8	8	5.01	0.074	0.061	1.22

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	289	50.6	17.5	15	296	29.3	16.3	5.64
ADF-ash-free	g/kg	433	20.9	4.8	8	434	10.3	9.23	2.13
NDF-ash-free	g/kg	644	39.3	6.1	8	646	19.1	17.4	2.70
Total ash	g/kg	121	4.67	3.9	25	121	2.43	1.17	0.968



Indicative Values IPE 234

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	µg/kg	57.5	23.1	40.1	30	63.7	14.7	5.26	9.15
I	µg/kg	247	61.3	24.9	9	257	43.0	25.6	10.4
Li	µg/kg	269	131	48.8	11	300	64.0	49.5	18.4
Pb	µg/kg	124	44.5	35.9	44	130	28.5	8.38	6.76
Sb	µg/kg	8.99	3.28	36.5	7	9.22	1.93	1.55	17.2
Sn	µg/kg	83.7	41.6	49.7	6	89.5	29.9	21.2	25.3
Ti	mg/kg	5.60	1.57	28.1	9	6.11	1.12	0.656	11.7
Be	µg/kg	5.04	1.74	34.6	5	5.45	1.06	0.975	19.3
Cs	µg/kg	10.3	0.899	8.7	4	10.5	0.440	0.562	5.44

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	140	52.8	37.6	20	146	30.7	14.8	10.5

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total fat	g/kg	38.1	14.0	36.8	11	37.9	9.10	5.28	13.9