



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 238



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 238 of Banana (leaf) / Musa sp., from Philippines, 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
2021	3	2
2017	3	1



Consensus Values IPE 238

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	26.0	2.47	9.5	166	25.8	1.42	0.239	0.921
Cu	mg/kg	11.0	0.881	8.0	204	11.0	0.500	0.077	0.700
Fe	mg/kg	93.7	9.46	10.1	222	94.1	5.90	0.793	0.846
Mn	mg/kg	912	71.7	7.9	220	912	42.6	6.04	0.662
Zn	mg/kg	22.7	1.88	8.3	226	22.7	1.13	0.156	0.689
Br	mg/kg	17.5	2.09	11.9	23	17.3	1.33	0.544	3.11
Co	µg/kg	76.7	11.4	14.8	61	77.7	6.68	1.82	2.37
Cr	µg/kg	624	170	27.3	63	638	110	26.8	4.30
Mo	µg/kg	347	45.2	13.0	58	350	22.7	7.41	2.14
Ni	µg/kg	643	90.6	14.1	41	650	42.2	17.7	2.75
Ba	mg/kg	25.3	2.75	10.9	36	25.2	1.72	0.572	2.26
Sr	mg/kg	21.1	2.21	10.5	32	21.1	1.40	0.488	2.31
Cs	µg/kg	41.7	8.33	20.0	16	42.3	5.90	2.60	6.24
Rb	µg/kg	11751	1206	10.3	26	11665	665	296	2.52
Ca	g/kg	7.07	0.480	6.8	227	7.08	0.282	0.040	0.563
Cl (as Cl)	g/kg	9.81	0.662	6.7	45	9.80	0.400	0.123	1.26
K	g/kg	39.0	3.05	7.8	244	39.0	1.82	0.244	0.626
Mg	g/kg	3.07	0.190	6.2	225	3.08	0.122	0.016	0.516
N - Kjeldahl (as N)	g/kg	29.3	1.39	4.8	132	29.2	0.822	0.152	0.517
Na	mg/kg	94.7	21.2	22.3	131	95.6	14.1	2.31	2.44
P (as P)	g/kg	2.10	0.135	6.4	221	2.10	0.090	0.011	0.542
S (as S)	g/kg	2.36	0.206	8.7	125	2.36	0.135	0.023	0.976

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	461	11.8	2.6	70	461	8.02	1.77	0.384
N - elementary	g/kg	30.9	0.924	3.0	101	30.9	0.600	0.115	0.372

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	31.8	7.55	23.7	39	32.1	4.10	1.51	4.75

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-26.3	0.178	0.7	9	-26.2	0.160	0.074	0.283
delta 15N	‰ Air	5.66	0.209	3.7	9	5.64	0.128	0.087	1.54



Consensus Values IPE 238

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	283	31.1	11.0	14	279	21.6	10.4	3.67
ADF-ash-free	g/kg	390	27.5	7.0	9	388	14.1	11.4	2.94
NDF-ash-free	g/kg	707	16.1	2.3	8	702	11.2	7.14	1.01
Total ash	g/kg	106	4.55	4.3	33	105	2.90	0.991	0.936



Indicative Values IPE 238

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	µg/kg	12.8	9.01	70.4	28	14.9	4.31	2.13	16.6
Cd	µg/kg	7.28	4.06	55.7	34	7.49	2.49	0.870	11.9
Hg	µg/kg	7.41	2.54	34.3	27	7.72	1.52	0.612	8.26
I	µg/kg	127	37.6	29.6	8	127	21.5	16.6	13.1
Li	µg/kg	39.5	32.7	82.9	11	37.7	22.0	12.3	31.2
Pb	µg/kg	60.5	33.6	55.5	44	69.6	22.9	6.33	10.5
Se	µg/kg	41.4	17.5	42.2	24	42.5	11.0	4.46	10.8
Sb	µg/kg	13.0	8.60	66.0	19	14.5	5.30	2.47	18.9
Ti	mg/kg	1.59	0.651	41.0	9	1.73	0.454	0.271	17.1
V	µg/kg	67.3	16.2	24.0	17	70.0	10.1	4.90	7.28
N - NO3 (as N)	mg/kg	44.3	18.9	42.7	6	51.4	7.08	9.64	21.8

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	33.7	12.5	37.2	29	36.1	8.17	2.91	8.64

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total fat	g/kg	33.8	11.8	35.0	11	33.0	7.00	4.45	13.2