WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 185

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis IPE 185

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 185 of Oil Palm (leaf) / Elaeis guineensis, from Senegal, 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
2019	1	2
2014	1	2

Consensus Values IPE 185

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	15.8	2.08	13.1	165	15.8	1.28	0.202	1.28
Cu	mg/kg	4.22	0.659	15.6	202	4.20	0.414	0.058	1.38
Fe	mg/kg	547	60.1	11.0	207	542	38.4	5.22	0.955
Mn	mg/kg	104	9.32	9.0	212	103	5.60	0.800	0.769
Zn	mg/kg	10.3	1.75	16.9	201	10.3	1.05	0.154	1.49
As	µg/kg	165	39.9	24.2	37	165	26.2	8.19	4.97
Co	µg/kg	169	23.3	13.8	44	170	14.5	4.39	2.61
Cr	µg/kg	1156	193	16.7	53	1160	117	33.2	2.87
Hg	µg/kg	51.9	5.90	11.4	30	52.2	4.04	1.35	2.59
Mo	µg/kg	361	44.1	12.2	58	367	27.1	7.24	2.01
Ni	µg/kg	973	192	19.7	47	988	122	34.9	3.59
Pb	µg/kg	337	63.6	18.8	53	346	36.0	10.9	3.24
Ba	mg/kg	4.51	0.503	11.2	26	4.48	0.320	0.123	2.73
V	µg/kg	924	131	14.2	22	933	87.5	34.9	3.78
Sr	mg/kg	20.4	1.28	6.3	26	20.3	0.770	0.313	1.54
Rb	µg/kg	5702	482	8.4	8	5736	273	213	3.73
Ca	g/kg	7.31	0.649	8.9	223	7.32	0.409	0.054	0.743
Cl (as Cl)	g/kg	6.27	0.426	6.8	36	6.20	0.240	0.089	1.41
K	g/kg	3.38	0.372	11.0	224	3.38	0.219	0.031	0.920
Mg	g/kg	4.08	0.320	7.9	226	4.07	0.195	0.027	0.653
N - Kjeldahl (as N)	g/kg	12.6	0.719	5.7	140	12.6	0.407	0.076	0.602
Na	mg/kg	1353	152	11.2	137	1345	94.1	16.2	1.20
P (as P)	g/kg	0.948	0.070	7.4	227	0.957	0.043	0.006	0.614
S (as S)	g/kg	1.24	0.122	9.8	135	1.25	0.063	0.013	1.06

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	483	14.9	3.1	68	482	8.85	2.26	0.468
Al	mg/kg	674	79.9	11.9	22	676	47.8	21.3	3.16
N - elementary	g/kg	13.1	0.562	4.3	101	13.1	0.370	0.070	0.533

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	568	109	19.2	49	558	66.1	19.5	3.43

Consensus Values IPE 185

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	317	29.5	9.3	13	316	15.6	10.2	3.23
Total ash	g/kg	75.3	2.54	3.4	30	75.6	1.45	0.580	0.770

Indicative Values IPE 185

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cd	µg/kg	10.6	3.48	32.7	41	11.6	2.25	0.680	6.39
I	µg/kg	2120	474	22.4	6	2180	319	242	11.4
Li	µg/kg	504	113	22.5	17	484	90.7	34.3	6.81
Se	µg/kg	196	54.1	27.5	30	199	31.0	12.3	6.29
Sb	µg/kg	7.38	3.33	45.2	10	7.12	1.93	1.32	17.9
Sn	µg/kg	58.6	29.3	49.9	11	66.9	25.0	11.0	18.8
Ti	mg/kg	14.3	11.8	82.5	12	15.0	8.20	4.25	29.8
Ag	µg/kg	8.17	4.26	52.2	6	8.41	1.76	2.18	26.6
Be	µg/kg	26.4	5.54	21.0	12	25.9	3.65	2.00	7.58
N - NH4 (as N)	mg/kg	55.1	28.5	51.7	4	56.3	13.4	17.8	32.3
N - NO3 (as N)	mg/kg	13.2	8.54	64.6	10	17.5	6.28	3.38	25.5

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Si	mg/kg	17001	1500	8.8	5	16717	954	838	4.93

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-28.6	0.156	0.5	7	-28.6	0.080	0.074	0.257
delta 15N	‰ Air	2.14	0.327	15.3	7	2.22	0.230	0.155	7.23

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
ADF-ash-free	g/kg	414	28.3	6.8	6	411	11.0	14.4	3.49
NDF-ash-free	g/kg	573	77.4	13.5	6	560	40.5	39.5	6.90
Total fat	g/kg	28.6	11.9	41.5	9	28.0	7.00	4.95	17.3