



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 186



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 186 of Rice straw / *Oryza sativa*, from Philippines, is prepared for the WEPAL proficiency programs. The sample has been used in 5 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
2022	4	3
2019	2	2
2014	4	4
2011	1	4
2008	2	3



Consensus Values IPE 186



Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	11.8	3.93	33.2	367	12.5	2.60	0.256	2.17
Cu	mg/kg	2.94	0.718	24.4	469	2.96	0.410	0.041	1.41
Fe	mg/kg	176	30.2	17.1	480	176	20.0	1.72	0.977
Mn	mg/kg	342	47.8	13.9	491	342	30.3	2.69	0.787
Zn	mg/kg	17.1	3.10	18.1	486	17.2	1.89	0.176	1.03
As	µg/kg	1565	255	16.3	113	1545	155	30.0	1.92
Co	µg/kg	205	39.1	19.1	109	208	22.0	4.68	2.29
Cr	µg/kg	9661	3433	35.5	118	9665	2335	395	4.09
Hg	µg/kg	626	54.0	8.6	90	629	32.7	7.11	1.14
I	µg/kg	592	115	19.4	17	614	45.0	34.9	5.89
Mo	µg/kg	2215	393	17.8	150	2241	269	40.1	1.81
Ni	µg/kg	6215	1626	26.2	124	6227	1071	183	2.94
Pb	µg/kg	336	125	37.2	121	355	75.0	14.2	4.23
Se	µg/kg	35.4	11.7	33.2	54	37.6	7.63	2.00	5.64
Ba	mg/kg	24.5	1.85	7.6	49	24.4	1.20	0.331	1.35
V	µg/kg	322	64.5	20.0	42	320	41.0	12.4	3.87
Sr	mg/kg	12.4	1.03	8.3	52	12.4	0.725	0.178	1.43
Cs	µg/kg	56.2	5.70	10.2	10	56.8	2.00	2.25	4.01
Rb	µg/kg	15481	1220	7.9	23	15482	832	318	2.05
Ca	g/kg	3.26	0.341	10.4	517	3.27	0.205	0.019	0.574
Cl (as Cl)	g/kg	4.15	0.322	7.8	92	4.15	0.200	0.042	1.01
K	g/kg	16.0	1.72	10.8	529	16.0	1.16	0.094	0.587
Mg	g/kg	1.15	0.128	11.2	528	1.14	0.081	0.007	0.609
N - Kjeldahl (as N)	g/kg	9.12	0.688	7.5	344	9.13	0.418	0.046	0.508
Na	mg/kg	84.0	23.2	27.7	268	84.4	14.0	1.77	2.11
P (as P)	g/kg	0.785	0.072	9.2	529	0.790	0.046	0.004	0.501
S (as S)	g/kg	0.816	0.082	10.1	305	0.810	0.050	0.006	0.723

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	380	12.2	3.2	170	380	7.62	1.17	0.309
Al	mg/kg	119	35.7	30.1	52	112	21.8	6.19	5.22
Si	mg/kg	76010	5713	7.5	11	76895	3255	2153	2.83
N - elementary	g/kg	9.59	0.593	6.2	251	9.57	0.360	0.047	0.488



Consensus Values IPE 186

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	101	13.2	13.0	112	102	8.02	1.56	1.54

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-29.1	0.311	1.1	39	-29.1	0.234	0.062	0.214
delta 15N	‰ Air	3.54	0.597	16.9	43	3.55	0.350	0.114	3.21

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	308	24.4	7.9	28	306	12.5	5.75	1.87
ADF-ash-free	g/kg	369	25.2	6.8	15	371	14.4	8.14	2.20
NDF-ash-free	g/kg	610	22.7	3.7	14	609	14.0	7.59	1.25
Total ash	g/kg	213	7.92	3.7	55	212	5.00	1.34	0.628



Indicative Values IPE 186

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Br	mg/kg	10.6	3.19	30.0	6	11.1	2.43	1.63	15.3
Cd	µg/kg	9.92	6.27	63.2	69	13.0	4.50	0.943	9.51
Ga	µg/kg	38.5	8.42	21.9	4	40.8	4.50	5.26	13.7
Li	µg/kg	91.7	23.6	25.7	20	87.8	12.4	6.58	7.18
Sb	µg/kg	5.98	6.62	110.7	25	6.90	4.54	1.65	27.7
Sn	µg/kg	36.4	32.7	89.9	21	36.9	19.8	8.93	24.5
Ti	mg/kg	6.95	1.90	27.4	17	7.18	0.937	0.577	8.30
N - NH4 (as N)	mg/kg	146	138	94.2	13	178	128	47.7	32.7
N - NO3 (as N)	mg/kg	10.3	9.96	97.1	19	12.0	7.84	2.86	27.8
SO4 (as SO4)	g/kg	0.277	0.157	56.9	11	0.350	0.060	0.059	21.4

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total fat	g/kg	14.3	9.72	68.0	21	13.6	6.00	2.65	18.6