WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 186

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis IPE 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 mean and standard deviation are calculated using all reported data when at least 8 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into three sections: Consensus Values, Indicative Values and Values for Information. The division is made on the reliability of the data. Consensus Values are based on at least 16 results while the coefficient of variation is smaller than 25 %. Indicative Values are based on at least 8 and less than 16 results or a coefficient of variation between 25 % and 50 %. Other values, based on more than 2 and less than 8 results or a coefficient of variation higher than 50 %, are given for information only.

In the sections with Consensus Values and Indicative Values the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median and MAD (Median of Absolute Deviation) and the uncertainty in the consensus values. The confidence limits (at 95 % probability) are calculated for these determinands.
In the section with Information Values the following parameters are given: median, MAD and number of results. For determinands which have at least 5 results reported as smaller than (<) the median of these ‘smaller than results’ is calculated. In some cases this median of ‘<’ values is much smaller than median and mean of the indicative values. This may be caused by a too optimistic (too low) value for the detection limit reported by a (small) majority of participating laboratories who report ‘<’-values.

All values, expressed on a weight basis (kg or %), are reported in oven dry (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 ºC 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 is 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	95 % confidence limits
As	µg/kg	1570	235	15.0	114	1550	160	28	1525 - 1612
Ba	mg/kg	24.5	1.71	7.0	49	24.4	1.20	0.31	24.0 - 25.0
Ca	g/kg	3.27	0.293	9.0	517	3.27	0.205	0.016	3.24 - 3.29
Cl (as Cl)	g/kg	4.15	0.287	6.9	92	4.15	0.200	0.037	4.09 - 4.21
Co	µg/kg	207	33.2	16.1	109	208	22.0	4.0	201 - 213
Cu	mg/kg	2.97	0.605	20.4	469	2.96	0.410	0.035	2.92 - 3.03
Fe	mg/kg	177	29.2	16.6	480	176	20.0	1.7	173.9 - 179.1
Hg	µg/kg	628	47.2	7.5	90	629	32.7	6.2	618 - 638
I	µg/kg	604	65.3	10.8	17	614	45.0	19.8	571 - 638
K	g/kg	16.0	1.68	10.5	529	16.0	1.17	0.09	15.83 - 16.12
Li	µg/kg	90.7	19.12	21.1	20	87.8	12.39	5.34	81.8 - 99.7
Mg	g/kg	1.15	0.119	10.3	529	1.14	0.081	0.006	1.14 - 1.16
Mn	mg/kg	344	44.8	13.1	491	342	30.3	2.5	340 - 348
Mo	µg/kg	2210	396	17.9	150	2240	269	40	2149 - 2277
N - Kjeldahl (as N)	g/kg	9.12	0.600	6.6	344	9.13	0.418	0.040	9.05 - 9.18
Na	mg/kg	83.4	19.97	23.9	268	84.4	13.99	1.53	81.0 - 85.8
P (as P)	g/kg	0.785	0.0653	8.3	529	0.790	0.0460	0.0036	0.779 - 0.790
Rb	µg/kg	15500	1170	7.6	23	15500	830	310	14990 - 16000
S (as S)	g/kg	0.815	0.0717	8.8	305	0.810	0.0500	0.0051	0.807 - 0.823
Sr	mg/kg	12.4	1.05	8.5	52	12.4	0.73	0.18	12.11 - 12.70
Ti	mg/kg	7.07	1.380	19.5	17	7.18	0.937	0.418	6.36 - 7.78
V	µg/kg	321	57.5	17.9	42	320	41.0	11.1	303 - 339
Zn	mg/kg	17.2	2.77	16.1	486	17.2	1.89	0.16	16.98 - 17.47

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
C - elementary	g/kg	380	11.1	2.9	170	380	7.6	1.1	378.1 - 381.4
N - elementary	g/kg	9.57	0.527	5.5	251	9.57	0.360	0.042	9.51 - 9.64

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Al	mg/kg	101	12.2	12.0	112	102	8.3	1.4	98.9 - 103.5

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
delta 13C	‰ V-PDB	-29.1	0.32	1.1	39	-29.1	0.23	0.06	-29.21 - -29.00
delta 15N	‰ Air	3.55	0.492	13.8	43	3.55	0.350	0.094	3.40 - 3.70

Consensus Values IPE 186

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Crude fibre	g/kg	307	18.6	6.1	28	306	12.5	4.4	300	-	314
Total ash	g/kg	213	6.9	3.3	55	212	5.0	1.2	211.0	-	214.8

Indicative Values IPE 186

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
B	mg/kg	11.8	4.02	34.0	367	12.5	2.62	0.26	11.4 - 12.2
Cr	µg/kg	9630	3473	36.1	118	9650	2350	400	9000 - 10270
Cs	µg/kg	56.5	2.82	5.0	10	56.8	2.00	1.11	54.5 - 58.5
Ni	µg/kg	6210	1634	26.3	123	6180	1102	184	5915 - 6499
Pb	µg/kg	339	112.2	33.1	121	360	80.0	12.7	319 - 360
Se	µg/kg	36.0	10.48	29.1	54	37.6	7.63	1.78	33.2 - 38.9
SO4 (as SO4)	g/kg	0.321	0.0895	27.9	11	0.350	0.0600	0.0337	0.262 - 0.381

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Al	mg/kg	119	35.7	30.1	52	112	21.8	6.2	109 - 128
Si	mg/kg	76200	4410	5.8	11	76900	3260	1660	73260 - 79120

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
ADF-ash-free	g/kg	371	20.7	5.6	15	371	14.4	6.7	359 - 382
NDF-ash-free	g/kg	609	20.3	3.3	14	609	14.0	6.8	597 - 621

Informative Values IPE 186

Method: Inorganic Chemical Composition

Element	Unit	Median	MAD	N	Results smaller than (<) Median of <	N
Ag	µg/kg	5.32	3.840	6	50.00	5
Be	µg/kg	3.30	1.800	7	20.00	23
Bi	µg/kg	3.41	2.500	6	29.00	10
Br	mg/kg	11.1	2.43	6		
Cd	µg/kg	13.0	4.50	69	50.0	81
Ga	µg/kg	40.8	4.50	4		
N - NH4 (as N)	mg/kg	178	128.0	13		
N - NO3 (as N)	mg/kg	12.0	7.84	19	48.6	18
Sb	µg/kg	6.90	4.540	25	30.00	13
Sn	µg/kg	36.9	19.80	21	150.0	8

Method: Acid extractable (So-called totals)

Element	Unit	Median	MAD	N
Si	mg/kg	5980	5974	7

Method: Nutritional values

Element	Unit	Median	MAD	N
Total fat	g/kg	13.6	6.00	21