WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 783

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis IPE 783

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 783 of Wheat (grain) / Triticum aestivum, from Netherlands, 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
2010	2	4
2006	2	4
1999	2	2
1998	2	6
1995	5	2

Consensus Values IPE 783

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	1.68	0.998	59.5	336	1.82	0.660	0.068	4.05
Cu	mg/kg	3.32	0.552	16.7	571	3.33	0.330	0.029	0.871
Fe	mg/kg	34.5	6.45	18.7	573	35.0	4.01	0.337	0.978
Mn	mg/kg	18.9	2.10	11.1	603	19.0	1.30	0.107	0.563
Zn	mg/kg	23.0	2.33	10.1	604	23.0	1.50	0.119	0.514
As	µg/kg	99.4	23.3	23.4	69	102	14.5	3.50	3.52
Cd	µg/kg	38.6	11.8	30.7	144	39.6	7.45	1.23	3.20
Mo	µg/kg	657	88.7	13.5	119	663	47.0	10.2	1.55
Se	µg/kg	67.2	17.6	26.2	41	68.1	9.10	3.43	5.11
Ba	mg/kg	0.676	0.216	32.0	48	0.700	0.155	0.039	5.77
Sr	mg/kg	1.96	0.218	11.1	60	2.00	0.115	0.035	1.79
Rb	µg/kg	3334	197	5.9	18	3346	119	58.0	1.74
Ca	g/kg	0.360	0.101	27.9	591	0.368	0.058	0.005	1.44
Cl (as Cl)	g/kg	0.729	0.174	23.9	117	0.734	0.104	0.020	2.77
K	g/kg	5.41	0.487	9.0	624	5.43	0.287	0.024	0.451
Mg	g/kg	1.17	0.097	8.3	616	1.18	0.063	0.005	0.418
N - Kjeldahl (as N)	g/kg	13.2	0.789	6.0	428	13.2	0.502	0.048	0.361
Na	mg/kg	37.9	26.9	71.2	356	41.6	18.6	1.79	4.72
P (as P)	g/kg	3.89	0.263	6.8	617	3.89	0.170	0.013	0.340
S (as S)	g/kg	0.972	0.111	11.4	306	0.978	0.071	0.008	0.813

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	440	14.6	3.3	98	441	8.40	1.85	0.420
N - elementary	g/kg	13.5	0.848	6.3	207	13.6	0.566	0.074	0.544

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-25.5	0.139	0.5	12	-25.5	0.100	0.050	0.196

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	25.6	4.56	17.8	19	25.5	2.40	1.31	5.11
Total ash	g/kg	19.1	1.63	8.6	30	18.9	0.950	0.372	1.95

Indicative Values IPE 783

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Br	mg/kg	2.15	0.525	24.5	7	2.26	0.290	0.248	11.6
Co	µg/kg	9.26	7.76	83.8	62	10.0	5.00	1.23	13.3
Cr	µg/kg	169	130	76.9	85	200	95.0	17.6	10.4
Hg	µg/kg	1.71	0.913	53.3	63	1.85	0.750	0.144	8.40
Li	µg/kg	20.2	14.5	71.5	8	23.5	5.80	6.39	31.6
Ni	µg/kg	151	96.1	63.6	90	173	71.5	12.7	8.38
Pb	µg/kg	106	75.7	71.7	118	125	62.1	8.71	8.25
Sb	µg/kg	3.16	4.31	136.4	13	4.20	2.70	1.50	47.3
Sn	µg/kg	26.3	34.5	131.0	8	34.8	25.9	15.2	57.9
Ti	mg/kg	0.532	0.518	97.4	8	0.485	0.325	0.229	43.0
V	µg/kg	20.7	23.5	113.7	25	28.0	18.0	5.87	28.4
Be	µg/kg	7.17	8.08	112.7	12	12.4	8.00	2.92	40.7
N - NH4 (as N)	mg/kg	29.0	26.6	91.6	17	35.9	19.1	8.05	27.8
N - NO3 (as N)	mg/kg	8.69	12.9	148.2	44	14.0	11.6	2.43	27.9
SO4 (as SO4)	g/kg	0.185	0.173	94.0	17	0.210	0.140	0.053	28.5

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	10.8	4.08	38.0	19	10.0	3.37	1.17	10.9

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	7.14	3.44	48.1	38	7.08	2.25	0.697	9.76

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 15N	‰ Air	1.06	1.23	116.8	13	1.25	0.800	0.428	40.5

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
ADF-ash-free	g/kg	31.9	3.51	11.0	5	32.1	1.10	1.96	6.16
NDF-ash-free	g/kg	135	37.5	27.7	5	144	24.0	20.9	15.5
Total fat	g/kg	16.3	6.96	42.7	10	16.3	5.00	2.75	16.9
Polysaccharides (starch)	g/kg	812	92.2	11.4	4	788	48.0	57.6	7.10