WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 980

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis IPE 980

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 980 of Gerbera leaf/ Gerbera jamesonii, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 24 periods (or rounds). Only results from the last 5 periods are used. This way, the consensus values reflect the latest 'state of the art' analytical techniques used by the laboratories.It also gives a better estimate of the concentrations of non-stable or volatile determinands. The results on which the values in this report are based were taken from the periods given in the following table:

Year	Round	Number
2023	3	3
2019	4	3
2015	1	4
2011	1	2
2007	3	2

Consensus Values IPE 980

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	31.9	2.88	9.0	400	32.0	1.78	0.180	0.563
Cu	mg/kg	4.23	0.608	14.4	526	4.26	0.378	0.033	0.784
Fe	mg/kg	169	20.9	12.4	544	170	13.0	1.12	0.663
Mn	mg/kg	90.0	6.70	7.5	546	90.0	4.03	0.359	0.399
Zn	mg/kg	54.1	4.67	8.6	554	54.0	2.98	0.248	0.458
As	µg/kg	47.1	15.7	33.3	80	48.4	8.42	2.19	4.65
Br	mg/kg	21.0	1.78	8.4	31	21.0	1.01	0.399	1.90
Cd	µg/kg	130	14.7	11.3	163	130	10.0	1.44	1.10
Co	µg/kg	150	28.4	18.9	142	149	16.7	2.98	1.98
Cr	µg/kg	462	175	37.9	140	483	119	18.5	4.01
Hg	µg/kg	25.8	2.81	10.9	90	25.9	1.67	0.370	1.43
Li	µg/kg	635	120	18.9	32	625	71.0	26.6	4.18
Mo	µg/kg	390	53.1	13.6	133	394	32.1	5.75	1.48
Ni	µg/kg	624	128	20.5	128	633	72.0	14.2	2.27
Pb	µg/kg	844	154	18.2	155	835	91.0	15.5	1.83
Ba	mg/kg	1.81	0.163	9.0	47	1.82	0.107	0.030	1.64
Sb	µg/kg	27.7	8.20	29.7	45	28.6	5.10	1.53	5.53
V	µg/kg	413	84.6	20.5	55	410	50.0	14.3	3.45
Sr	mg/kg	18.2	1.91	10.5	65	18.1	1.40	0.296	1.63
Rb	µg/kg	4991	468	9.4	46	5042	342	86.3	1.73
Ca	g/kg	16.3	1.22	7.5	575	16.2	0.759	0.064	0.392
Cl (as Cl)	g/kg	19.7	1.20	6.1	114	19.6	0.675	0.140	0.710
K	g/kg	52.6	4.07	7.7	593	52.6	2.60	0.209	0.397
Mg	g/kg	3.61	0.271	7.5	572	3.60	0.170	0.014	0.392
N - Kjeldahl (as N)	g/kg	25.9	1.95	7.5	353	25.9	1.18	0.130	0.501
N - NO3 (as N)	mg/kg	8234	579	7.0	46	8176	389	107	1.30
Na	mg/kg	3551	329	9.3	358	3539	200	21.7	0.612
P (as P)	g/kg	4.39	0.294	6.7	560	4.38	0.190	0.016	0.353
S (as S)	g/kg	2.30	0.186	8.1	328	2.30	0.110	0.013	0.557

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	407	14.4	3.5	157	407	8.95	1.44	0.353
Al	mg/kg	126	25.4	20.1	69	125	16.3	3.83	3.03
N - elementary	g/kg	30.6	1.29	4.2	250	30.6	0.895	0.102	0.333

Consensus Values IPE 980

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	111	16.3	14.6	118	112	9.16	1.87	1.68

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-34.2	0.425	1.2	14	-34.3	0.165	0.142	0.415

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	227	18.1	8.0	31	227	9.00	4.07	1.79
ADF-ash-free	g/kg	273	23.4	8.5	19	275	11.1	6.70	2.45
NDF-ash-free	g/kg	322	41.2	12.8	18	326	29.2	12.1	3.77
Total ash	g/kg	161	9.45	5.9	62	162	5.50	1.50	0.931

Indicative Values IPE 980

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
I	µg/kg	128	88.8	69.1	17	150	42.0	26.9	20.9
Se	µg/kg	18.2	9.23	50.6	45	18.7	4.27	1.72	9.43
Sn	µg/kg	163	67.1	41.2	23	164	38.0	17.5	10.7
Ti	mg/kg	17.1	4.34	25.4	24	17.2	2.52	1.11	6.49
Be	µg/kg	4.90	1.48	30.3	15	5.50	0.780	0.479	9.78
Cs	µg/kg	13.4	6.24	46.4	17	13.9	3.70	1.89	14.1
N - NH4 (as N)	mg/kg	336	234	69.7	14	398	136	78.3	23.3
SO4 (as SO4)	g/kg	2.64	1.19	44.9	12	2.77	1.05	0.428	16.2

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Si	mg/kg	683	313	45.9	6	791	124	160	23.4

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Si	mg/kg	466	275	59.0	10	555	136	109	23.3

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 15N	‰ Air	1.58	0.437	27.7	12	1.55	0.235	0.158	9.99

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total fat	g/kg	19.1	7.28	38.2	25	20.7	4.30	1.82	9.55