WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 949

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis IPE 949

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 949 of Aubergine (plant) / Solanum melongena l. from Netherlands is prepared for the WEPAL proficiency programs. The sample is used in 16 periods (or rounds). Only results from the last 5 periods are used. In this way the consensus values will reflect the latest 'state of the art' in the analytical techniques used in the laboratories. It will also give 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
2016	4	1
2012	2	3
2008	4	3
2008	3	4
2008	2	1

Consensus Values IPE 949

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
As	µg/kg	287	21.1	7.4	103	287	15.0	2.6	283 - 291
B	mg/kg	18.2	1.60	8.8	378	18.2	1.10	0.10	18.02 - 18.34
Ba	mg/kg	2.75	0.418	15.2	48	2.79	0.287	0.075	2.62 - 2.87
Be	µg/kg	10.1	1.45	14.3	26	10.0	1.00	0.35	9.52 - 10.7
Ca	g/kg	11.5	0.63	5.5	554	11.5	0.44	0.03	11.40 - 11.50
Cd	µg/kg	413	28.1	6.8	194	413	19.5	2.5	409 - 417
Cl (as Cl)	g/kg	3.79	0.165	4.3	105	3.79	0.110	0.020	3.76 - 3.83
Co	µg/kg	101	19.0	18.7	111	102	13.3	2.3	97.8 - 104.9
Cr	µg/kg	533	67.9	12.7	130	540	47.5	7.4	521 - 544
Cu	mg/kg	6.63	0.504	7.6	516	6.67	0.345	0.028	6.59 - 6.68
Fe	mg/kg	203	19.3	9.5	520	204	13.4	1.1	201.1 - 204.4
Hg	µg/kg	4.07	0.487	12.0	73	4.15	0.350	0.071	3.96 - 4.18
K	g/kg	23.2	1.10	4.7	566	23.3	0.76	0.06	23.15 - 23.33
Li	µg/kg	4130	503	12.2	29	4100	349	117	3936 - 4318
Mg	g/kg	1.60	0.088	5.5	565	1.60	0.060	0.005	1.59 - 1.61
Mn	mg/kg	19.9	1.49	7.5	532	20.0	1.00	0.08	19.80 - 20.06
Mo	µg/kg	533	57.9	10.9	136	533	41.2	6.2	523 - 542
N - Kjeldahl (as N)	g/kg	14.4	0.86	6.0	388	14.4	0.60	0.05	14.29 - 14.47
N - NH4 (as N)	mg/kg	719	141.7	19.7	16	704	94.6	44.3	644 - 794
N - NO3 (as N)	mg/kg	4620	281	6.1	49	4620	189	50	4544 - 4705
Na	mg/kg	242	28.5	11.8	320	243	19.7	2.0	238.8 - 245.1
Ni	µg/kg	435	43.2	9.9	124	440	31.0	4.8	427 - 443
P (as P)	g/kg	2.02	0.111	5.5	564	2.01	0.078	0.006	2.01 - 2.03
Pb	µg/kg	900	105.6	11.7	173	911	73.0	10.0	885 - 916
Rb	µg/kg	5140	304	5.9	25	5120	192	76	5013 - 5263
S (as S)	g/kg	1.25	0.073	5.8	311	1.25	0.050	0.005	1.24 - 1.26
Sn	µg/kg	1370	326	23.7	31	1330	233	73	1254 - 1493
Sr	mg/kg	26.7	1.54	5.8	62	26.7	1.00	0.24	26.35 - 27.13
V	µg/kg	453	66.9	14.8	51	444	46.0	11.7	434 - 472
Zn	mg/kg	104	6.0	5.8	534	104	4.2	0.3	103.7 - 104.7

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
C - elementary	g/kg	439	11.2	2.5	162	439	7.8	1.1	437.7 - 441.2
N - elementary	g/kg	16.6	0.88	5.3	248	16.6	0.60	0.07	16.48 - 16.71

Consensus Values IPE 949

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Al	mg/kg	202	40.2	19.9	108	203	27.0	4.8	194 - 210

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
delta 13C	‰ V-PDB	-27.8	0.37	1.3	33	-27.8	0.26	0.08	-27.92 - -27.66
delta 15N	‰ Air	3.64	0.725	19.9	40	3.67	0.530	0.143	3.40 - 3.87

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Crude fibre	g/kg	532	21.9	4.1	26	528	15.0	5.4	523 - 541
Total ash	g/kg	81.4	3.95	4.8	48	81.7	2.70	0.71	80.3 - 82.6

Indicative Values IPE 949

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Br	mg/kg	20.2	3.09	15.3	8	21.2	2.39	1.37	17.7 - 22.8
Cs	µg/kg	47.3	9.29	19.6	12	47.1	6.25	3.35	41.5 - 53.2
Ga	µg/kg	68.0	24.68	36.3	9	67.0	16.12	10.28	49.4 - 86.6
I	µg/kg	120	40.6	33.9	19	129	31.2	11.7	101 - 140
Sb	µg/kg	17.7	6.32	35.8	26	18.2	4.75	1.55	15.1 - 20.2
SO4 (as SO4)	g/kg	1.30	0.555	42.7	21	1.43	0.370	0.151	1.05 - 1.55

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Al	mg/kg	284	83.1	29.3	55	300	57.3	14.0	261 - 306

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
ADF-ash-free	g/kg	602	25.2	4.2	14	597	18.6	8.4	588 - 616
NDF-ash-free	g/kg	700	9.0	1.3	11	699	6.5	3.4	694 - 706
Total fat	g/kg	7.50	3.475	46.4	17	7.56	2.460	1.054	5.72 - 9.27

Informative Values IPE 949

Method: Inorganic Chemical Composition

Element	Unit	Median	MAD	N	Results smaller than (<) Median of <	N
Ag	µg/kg	9.10	3.470	13		
Bi	µg/kg	3.06	1.410	13	100.00	5
F	mg/kg	3.77	0.865	6		
Se	µg/kg	17.0	6.95	49	100.0	38
Ti	mg/kg	4.57	1.553	18	5.00	5

Method: Real totals

Element	Unit	Median	MAD	N
Si	mg/kg	1350	225	7

Method: Acid extractable (So-called totals)

Element	Unit	Median	MAD	N
Si	mg/kg	382	188.0	6