WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 966

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis IPE 966

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 °C and milled to pass a 0.5 mm sieve.

This IPE sample 966 of Lucerne / Medicago sativum from Netherlands is prepared for the WEPAL proficiency programs. The sample is used in 1 period (or round). The results on which the values in this report are based were taken from the period given in the following table.

Year	Round	Number
1991	4	4

Consensus Values IPE 966

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
B	mg/kg	35.1	3.14	8.9	56	35.0	2.05	0.52	34.3 - 36.0
Ca	g/kg	22.5	1.48	6.6	107	22.6	1.04	0.18	22.25 - 22.82
Cl (as Cl)	g/kg	5.20	0.374	7.2	26	5.23	0.248	0.092	5.05 - 5.35
Cu	mg/kg	4.83	1.191	24.7	91	5.00	0.850	0.156	4.58 - 5.07
Fe	mg/kg	237	40.3	17.0	88	233	28.5	5.4	228 - 245
K	g/kg	26.1	1.45	5.6	117	26.0	1.02	0.17	25.85 - 26.38
Mg	g/kg	1.62	0.120	7.4	108	1.63	0.083	0.014	1.60 - 1.65
Mn	mg/kg	40.5	5.47	13.5	100	41.0	3.90	0.68	39.4 - 41.6
N - Kjeldahl (as N)	g/kg	26.8	1.46	5.4	88	26.8	0.99	0.19	26.51 - 27.12
P (as P)	g/kg	2.34	0.112	4.8	118	2.35	0.076	0.013	2.32 - 2.36
S (as S)	g/kg	2.85	0.377	13.2	39	2.85	0.257	0.075	2.73 - 2.97
Zn	mg/kg	20.0	1.79	8.9	94	20.2	1.20	0.23	19.67 - 20.41

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
N - elementary	g/kg	27.4	1.63	5.9	21	27.4	1.11	0.44	26.7 - 28.1

Indicative Values IPE 966

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Cd	µg/kg	44.8	13.22	29.5	9	50.0	10.00	5.51	34.8 - 54.7
Co	µg/kg	211	95.1	45.0	9	240	66.0	39.6	140 - 283
Mo	µg/kg	357	51.5	14.4	9	360	40.0	21.4	318 - 396
N - NO3 (as N)	mg/kg	219	31.3	14.3	14	212	21.0	10.5	201 - 237
Na	mg/kg	221	84.1	38.0	67	219	58.2	12.8	200 - 241
Pb	µg/kg	762	265.5	34.8	11	814	186.0	100.1	586 - 938

Informative Values IPE 966

Method: Inorganic Chemical Composition

Element	Unit	Median	MAD	N
As	µg/kg	412	88.0	3
Cr	µg/kg	740	258.0	7
Ni	µg/kg	990	91.0	7