



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 900



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 900 of Beet Spinach /Beta vulgaris 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
1994	6	2



Consensus Values IPE 900

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
B	mg/kg	24.0	2.62	10.9	71	24.6	1.80	0.39	23.4	-	24.6
Ca	g/kg	25.7	2.02	7.9	125	25.7	1.40	0.23	25.35	-	26.07
Cd	µg/kg	245	59.5	24.3	24	260	42.5	15.2	219	-	270
Cl (as Cl)	g/kg	11.0	0.69	6.2	28	11.2	0.50	0.16	10.76	-	11.29
Fe	mg/kg	206	34.1	16.6	109	210	23.0	4.1	199	-	212
K	g/kg	43.4	2.83	6.5	130	43.4	1.90	0.31	42.9	-	43.9
Mg	g/kg	2.11	0.149	7.0	124	2.10	0.101	0.017	2.09	-	2.14
Mn	mg/kg	10.9	1.78	16.3	119	11.1	1.22	0.20	10.61	-	11.25
N - Kjeldahl (as N)	g/kg	19.6	1.33	6.8	97	19.6	0.88	0.17	19.31	-	19.84
N - NO3 (as N)	mg/kg	9880	562	5.7	20	9770	371	157	9617	-	10142
Na	mg/kg	1410	162	11.5	83	1420	110	22	1373	-	1444
P (as P)	g/kg	2.73	0.171	6.3	122	2.73	0.119	0.019	2.70	-	2.76
S (as S)	g/kg	6.59	0.389	5.9	38	6.59	0.276	0.079	6.46	-	6.72
Zn	mg/kg	14.8	2.33	15.7	116	15.0	1.60	0.27	14.4	-	15.2

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
N - elementary	g/kg	23.5	2.42	10.3	23	23.3	1.68	0.63	22.4	-	24.5



Indicative Values IPE 900



Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Co	µg/kg	90.4	37.66	41.7	10	103.5	26.50	14.89	63.9	-	117
Cr	µg/kg	509	152.2	29.9	17	525	107.0	46.2	432	-	587
Cu	mg/kg	2.13	0.949	44.6	109	2.22	0.680	0.114	1.95	-	2.31
Hg	µg/kg	5.78	2.605	45.1	10	6.10	1.900	1.030	3.94	-	7.61
Mo	µg/kg	1410	87	6.2	10	1410	59	34	1345	-	1467
Ni	µg/kg	366	103.1	28.2	15	386	74.0	33.3	309	-	422



Informative Values IPE 900



Method: Inorganic Chemical Composition

Element	Unit	Median	MAD	N
As	µg/kg	165	30.0	7
Ba	mg/kg	6.79	0.460	4
Li	µg/kg	845	320.0	4
N - NH4 (as N)	mg/kg	92.5	8.27	3
Pb	µg/kg	1390	466	24
Se	µg/kg	69.5	23.00	4
SO4 (as SO4)	g/kg	14.7	0.12	3
Sr	mg/kg	105	6.0	5
V	µg/kg	472	25.0	4