



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 996



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 996 of Red-chicory / Asteraceae from Italy 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	4	5



Consensus Values IPE 996

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
B	mg/kg	29.4	3.73	12.7	68	29.8	2.50	0.57	28.5	-	30.3
Ca	g/kg	6.56	0.511	7.8	128	6.57	0.361	0.056	6.47	-	6.65
Cl (as Cl)	g/kg	17.0	1.93	11.3	27	17.0	1.36	0.46	16.3	-	17.8
Cu	mg/kg	16.7	2.08	12.4	110	17.0	1.45	0.25	16.33	-	17.12
Fe	mg/kg	121	17.5	14.4	114	123	12.4	2.0	117.7	-	124.2
K	g/kg	54.9	3.36	6.1	129	54.5	2.35	0.37	54.3	-	55.5
Mg	g/kg	2.64	0.161	6.1	128	2.65	0.108	0.018	2.61	-	2.66
Mn	mg/kg	31.6	3.31	10.5	121	31.7	2.30	0.38	31.0	-	32.2
N - Kjeldahl (as N)	g/kg	31.5	1.61	5.1	94	31.5	1.13	0.21	31.18	-	31.84
N - NO3 (as N)	mg/kg	1180	75	6.4	16	1170	51	23	1136	-	1215
Na	mg/kg	3950	328	8.3	87	3930	230	44	3879	-	4019
P (as P)	g/kg	6.28	0.314	5.0	123	6.22	0.217	0.035	6.23	-	6.34
S (as S)	g/kg	3.31	0.234	7.1	41	3.30	0.160	0.046	3.23	-	3.38
Zn	mg/kg	33.8	2.94	8.7	116	34.0	2.00	0.34	33.3	-	34.4

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
N - elementary	g/kg	32.3	1.72	5.3	25	32.7	1.15	0.43	31.6	-	33.0



Indicative Values IPE 996



Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Cd	µg/kg	268	76.8	28.7	31	272	55.0	17.3	239	-	296
Co	µg/kg	134	30.3	22.6	9	144	22.0	12.6	111	-	157
Cr	µg/kg	266	77.7	29.2	12	296	60.0	28.0	217	-	315
Hg	µg/kg	32.3	3.25	10.0	13	33.0	2.00	1.13	30.3	-	34.2
Mo	µg/kg	879	109.2	12.4	9	878	78.0	45.5	797	-	961
Ni	µg/kg	1350	166	12.3	13	1400	117	58	1252	-	1451
Pb	µg/kg	1020	319	31.2	23	1000	216	83	885	-	1159



Informative Values IPE 996



Method: Inorganic Chemical Composition

Element	Unit	Median	MAD	N
As	µg/kg	72.0	9.00	6
Ba	mg/kg	4.40	0.340	5
SO4 (as SO4)	g/kg	4.55	0.858	5
Sr	mg/kg	10.8	0.92	7
Ti	mg/kg	1.05	0.390	3
V	µg/kg	178	21.0	3