



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 174



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 174 of Tulip (tuber) / Tulipa l., from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 2 periods (or rounds). The results on which the values in this report are based were taken from the periods given in the following table:

Year	Round	Number
2009	4	2
2006	2	1



Consensus Values IPE 174

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	7.45	1.43	19.2	160	7.39	0.855	0.142	1.90
Cu	mg/kg	2.73	0.458	16.8	216	2.73	0.270	0.039	1.43
Fe	mg/kg	47.3	6.77	14.3	209	47.5	4.41	0.586	1.24
Mn	mg/kg	4.12	0.608	14.8	214	4.12	0.380	0.052	1.26
Zn	mg/kg	9.99	1.24	12.4	216	10.0	0.800	0.105	1.05
As	µg/kg	54.5	13.4	24.6	31	56.0	6.97	3.01	5.51
Cd	µg/kg	32.8	9.26	28.2	54	32.8	6.00	1.58	4.80
Hg	µg/kg	5.56	0.799	14.4	31	5.70	0.440	0.179	3.22
Mo	µg/kg	217	41.0	18.9	49	222	28.0	7.33	3.38
Sr	mg/kg	2.62	0.353	13.5	25	2.67	0.160	0.088	3.38
Ca	g/kg	0.702	0.103	14.6	216	0.704	0.060	0.009	1.24
Cl (as Cl)	g/kg	0.622	0.183	29.4	52	0.644	0.114	0.032	5.09
K	g/kg	7.46	0.593	7.9	231	7.47	0.330	0.049	0.654
Mg	g/kg	0.594	0.043	7.2	225	0.600	0.023	0.004	0.597
N - Kjeldahl (as N)	g/kg	11.0	0.616	5.6	148	11.0	0.360	0.063	0.577
Na	mg/kg	89.2	29.9	33.6	132	87.1	17.2	3.26	3.65
P (as P)	g/kg	1.88	0.125	6.6	235	1.90	0.090	0.010	0.542
S (as S)	g/kg	0.905	0.101	11.2	146	0.900	0.060	0.010	1.16

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	436	10.7	2.5	58	437	6.50	1.76	0.404
N - elementary	g/kg	11.3	0.609	5.4	101	11.3	0.300	0.076	0.668

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	30.6	6.45	21.1	45	31.2	3.70	1.20	3.92

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total ash	g/kg	19.6	1.79	9.1	14	19.9	1.14	0.597	3.04



Indicative Values IPE 174

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Co	µg/kg	17.6	5.30	30.1	35	18.6	3.60	1.12	6.35
Cr	µg/kg	199	84.5	42.5	45	210	60.0	15.7	7.93
Li	µg/kg	61.1	31.5	51.6	4	69.5	14.2	19.7	32.3
Ni	µg/kg	157	62.1	39.7	40	170	43.5	12.3	7.84
Pb	µg/kg	78.3	47.7	60.9	46	81.2	28.5	8.79	11.2
Se	µg/kg	15.4	7.35	47.6	15	15.0	5.00	2.37	15.4
Ba	mg/kg	0.341	0.193	56.7	16	0.386	0.175	0.060	17.7
Sb	µg/kg	9.20	1.48	16.1	9	9.10	0.800	0.618	6.72
V	µg/kg	84.9	18.1	21.3	12	88.3	11.0	6.52	7.68
Rb	µg/kg	1714	140	8.2	6	1696	65.0	71.5	4.17
N - NH4 (as N)	mg/kg	276	83.0	30.1	12	291	50.5	30.0	10.9
N - NO3 (as N)	mg/kg	19.0	26.7	140.6	18	20.7	18.4	7.88	41.4
SO4 (as SO4)	g/kg	0.894	0.350	39.2	7	0.971	0.161	0.166	18.5

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	41.0	11.1	27.1	18	40.2	8.70	3.26	7.97

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	22.8	6.20	27.2	11	22.9	3.10	2.34	10.2
Total fat	g/kg	5.07	2.33	46.0	7	5.20	1.90	1.10	21.7