



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 245



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 245 of Willow wood / *Salix alba.*, 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
2022	3	4
2019	2	4



Consensus Values IPE 245

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	10.7	1.56	14.6	152	10.8	0.970	0.159	1.48
Cu	mg/kg	3.60	0.551	15.3	185	3.63	0.331	0.051	1.41
Fe	mg/kg	91.4	12.0	13.1	185	92.0	7.51	1.10	1.21
Mn	mg/kg	54.5	4.33	7.9	197	54.2	2.68	0.386	0.708
Zn	mg/kg	20.7	1.87	9.0	194	20.7	1.05	0.167	0.809
As	µg/kg	62.2	10.9	17.6	35	63.3	6.70	2.31	3.72
Cd	µg/kg	211	24.2	11.5	58	212	15.0	3.97	1.88
Co	µg/kg	46.6	6.68	14.3	35	46.8	3.20	1.41	3.03
Cr	µg/kg	373	90.2	24.2	39	360	55.1	18.1	4.84
Hg	µg/kg	6.81	1.59	23.3	27	6.99	0.775	0.382	5.61
Mo	µg/kg	104	23.4	22.6	42	107	13.2	4.52	4.36
Ni	µg/kg	276	55.4	20.1	33	279	35.7	12.1	4.37
Pb	µg/kg	1281	165	12.9	56	1274	95.5	27.6	2.15
Ba	mg/kg	10.0	0.985	9.8	20	10.0	0.685	0.275	2.75
Sn	µg/kg	92.5	13.3	14.4	11	91.8	6.69	5.01	5.41
Sr	mg/kg	22.0	1.73	7.9	16	22.2	0.950	0.541	2.46
Ca	g/kg	6.59	0.531	8.1	205	6.56	0.340	0.046	0.704
K	g/kg	2.41	0.232	9.6	211	2.43	0.155	0.020	0.826
Mg	g/kg	0.493	0.041	8.4	202	0.500	0.030	0.004	0.738
N - Kjeldahl (as N)	g/kg	5.24	0.563	10.7	123	5.22	0.379	0.063	1.21
Na	mg/kg	189	32.5	17.2	121	190	17.6	3.69	1.96
P (as P)	g/kg	0.536	0.060	11.1	210	0.542	0.039	0.005	0.960
S (as S)	g/kg	0.472	0.059	12.4	121	0.480	0.035	0.007	1.41

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	489	15.5	3.2	76	489	8.70	2.22	0.454
N - elementary	g/kg	5.40	0.611	11.3	109	5.42	0.420	0.073	1.36

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	53.5	12.4	23.1	46	53.5	7.45	2.28	4.26

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-26.8	0.368	1.4	16	-26.7	0.225	0.115	0.429



Consensus Values IPE 245

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	524	43.8	8.4	14	519	26.6	14.6	2.79
ADF-ash-free	g/kg	652	79.5	12.2	8	648	41.6	35.1	5.39
Total ash	g/kg	25.4	2.64	10.4	28	25.2	1.80	0.624	2.45



Indicative Values IPE 245

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
I	µg/kg	533	138	26.0	7	537	77.0	65.4	12.3
Li	µg/kg	85.4	31.0	36.3	8	82.9	14.7	13.7	16.1
Se	µg/kg	47.2	14.5	30.8	21	47.0	10.0	3.96	8.40
Sb	µg/kg	46.1	23.4	50.8	10	55.9	11.9	9.26	20.1
Ti	mg/kg	1.63	0.699	42.8	6	1.68	0.395	0.357	21.8
V	µg/kg	180	37.3	20.7	13	182	25.0	12.9	7.16
Rb	µg/kg	2092	395	18.9	7	2137	292	187	8.92
Cl (as Cl)	g/kg	0.469	0.167	35.5	28	0.500	0.120	0.039	8.40

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	78.8	30.1	38.2	20	83.7	17.8	8.41	10.7
Si	mg/kg	904	456	50.5	4	876	256	285	31.5

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 15N	‰ Air	-1.38	0.305	22.1	15	-1.34	0.120	0.098	7.12

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
NDF-ash-free	g/kg	820	19.4	2.4	7	817	13.2	9.15	1.12
Total fat	g/kg	6.37	7.22	113.4	11	7.00	4.86	2.72	42.7