



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 200



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 200 of Maize (shoots) / Zea mays from Austria 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
2010	2	2



Consensus Values IPE 200

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
B	mg/kg	6.82	1.105	16.2	71	6.76	0.740	0.164	6.56	-	7.08
Ca	g/kg	3.55	0.242	6.8	112	3.58	0.170	0.029	3.50	-	3.59
Cd	µg/kg	38.8	5.33	13.7	21	38.6	3.56	1.45	36.4	-	41.2
Cl (as Cl)	g/kg	2.21	0.215	9.7	26	2.20	0.150	0.053	2.12	-	2.29
Cu	mg/kg	2.60	0.430	16.6	96	2.61	0.295	0.055	2.51	-	2.68
Fe	mg/kg	86.0	9.69	11.3	104	86.6	6.45	1.19	84.2	-	87.9
K	g/kg	10.7	0.71	6.7	111	10.7	0.50	0.08	10.57	-	10.84
Mg	g/kg	2.17	0.145	6.7	111	2.18	0.100	0.017	2.14	-	2.19
Mn	mg/kg	15.2	1.43	9.4	102	15.2	1.00	0.18	14.93	-	15.49
Mo	µg/kg	157	24.3	15.4	21	160	18.0	6.6	146	-	168
N - Kjeldahl (as N)	g/kg	6.36	0.475	7.5	72	6.40	0.318	0.070	6.25	-	6.47
P (as P)	g/kg	1.14	0.074	6.5	113	1.14	0.050	0.009	1.13	-	1.16
Pb	µg/kg	290	56.9	19.7	28	285	37.5	13.4	268	-	312
S (as S)	g/kg	0.722	0.0642	8.9	66	0.726	0.0450	0.0099	0.706	-	0.738
Zn	mg/kg	15.9	1.25	7.9	104	16.0	0.87	0.15	15.68	-	16.17

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
C - elementary	g/kg	444	12.1	2.7	39	444	8.4	2.4	440.4	-	448.2
N - elementary	g/kg	6.85	0.656	9.6	58	6.84	0.440	0.108	6.67	-	7.02



Indicative Values IPE 200

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
As	µg/kg	81.1	32.87	40.5	12	81.4	23.61	11.86	60.4	-	102
Ba	mg/kg	2.49	0.303	12.2	12	2.48	0.210	0.109	2.30	-	2.68
Co	µg/kg	42.5	17.88	42.1	20	45.8	12.42	5.00	34.1	-	50.8
Cr	µg/kg	390	179.9	46.2	21	372	111.8	49.1	308	-	471
Ni	µg/kg	190	78.1	41.2	17	187	49.0	23.7	150	-	230
Sr	mg/kg	13.5	0.76	5.6	15	13.7	0.50	0.25	13.12	-	13.96
V	µg/kg	147	35.2	24.0	8	152	26.0	15.6	118	-	175

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Al	mg/kg	82.4	27.25	33.1	12	81.0	18.70	9.83	65.2	-	99.5

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Al	mg/kg	65.2	21.53	33.0	21	61.0	14.36	5.87	55.4	-	75.0

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
delta 13C	‰ V-PDB	-11.9	0.14	1.2	11	-11.9	0.10	0.05	-11.99	-	-11.81
delta 15N	‰ Air	7180	335	4.7	12	7240	234	121	6969	-	7391

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Total ash	g/kg	43.6	1.51	3.5	13	44.0	1.00	0.52	42.7	-	44.5



Informative Values IPE 200



Method: Inorganic Chemical Composition

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
Be	µg/kg	10.5	10.00	4		
Hg	µg/kg	3.31	0.315	6	35.45	10
I	µg/kg	86.0	55.51	4		
Li	µg/kg	60.2	13.07	3		
N - NH4 (as N)	mg/kg	56.6	22.45	4		
N - NO3 (as N)	mg/kg	4.97	1.770	5	18.50	6
Na	mg/kg	28.3	15.70	57	100.0	13
Rb	µg/kg	1990	20	7		
Sb	µg/kg	10.8	6.50	4		
Se	µg/kg	17.0	7.00	9	315.5	6
Sn	µg/kg	35.7	35.44	3		
SO4 (as SO4)	g/kg	0.557	0.2530	4		

Method: Nutritional values

Element	Unit	Median	MAD	N
Crude fibre	g/kg	268	7.9	6
Total fat	g/kg	7.05	3.710	5