



**WAGENINGEN EVALUATING PROGRAMS  
FOR ANALYTICAL LABORATORIES**

---

**Certificate of Analysis**



**International Plant-Analytical Exchange**

**REFERENCE MATERIAL**

**IPE sample 160**

---



## 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 160 of Potato (pulp) / *Solanum tuberosum* from Netherlands is prepared for the WEPAL proficiency programs. The sample is used in 4 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
2016	3	1
2012	3	3
2008	4	2
2004	2	2



## Consensus Values IPE 160



### Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
As	µg/kg	171	17.3	10.1	86	171	12.0	2.3	167.6	-	175.0
B	mg/kg	4.79	1.125	23.5	310	4.80	0.770	0.080	4.67	-	4.92
Be	µg/kg	9.82	2.154	21.9	20	10.10	1.630	0.602	8.81	-	10.8
Ca	g/kg	0.879	0.0995	11.3	464	0.880	0.0700	0.0058	0.870	-	0.888
Cd	µg/kg	160	14.8	9.3	156	160	10.2	1.5	157.9	-	162.6
Cl (as Cl)	g/kg	1.17	0.133	11.3	96	1.19	0.092	0.017	1.15	-	1.20
Co	µg/kg	89.1	12.68	14.2	88	89.5	9.00	1.69	86.4	-	91.8
Cr	µg/kg	647	89.8	13.9	117	656	62.0	10.4	630	-	663
Cu	mg/kg	3.78	0.408	10.8	433	3.80	0.280	0.025	3.74	-	3.82
Fe	mg/kg	212	20.3	9.6	436	211	13.9	1.2	209.7	-	213.5
Hg	µg/kg	2.56	0.604	23.6	59	2.64	0.440	0.098	2.40	-	2.72
K	g/kg	19.2	1.04	5.4	479	19.2	0.71	0.06	19.07	-	19.25
Li	µg/kg	277	47.5	17.2	23	282	34.0	12.4	256	-	297
Mg	g/kg	0.884	0.0529	6.0	472	0.889	0.0359	0.0030	0.879	-	0.889
Mn	mg/kg	7.74	0.795	10.3	443	7.79	0.550	0.047	7.66	-	7.81
Mo	µg/kg	389	42.3	10.9	105	391	29.0	5.2	381	-	397
N - Kjeldahl (as N)	g/kg	11.8	0.73	6.2	327	11.8	0.50	0.05	11.68	-	11.84
N - NO3 (as N)	mg/kg	54.5	12.57	23.0	37	56.6	8.97	2.58	50.4	-	58.7
Ni	µg/kg	459	75.5	16.4	112	458	52.5	8.9	445	-	473
P (as P)	g/kg	2.25	0.118	5.2	482	2.25	0.080	0.007	2.24	-	2.26
Pb	µg/kg	415	78.4	18.9	135	417	53.0	8.4	401	-	428
Rb	µg/kg	4290	419	9.8	17	4370	302	127	4074	-	4502
S (as S)	g/kg	1.39	0.123	8.9	270	1.39	0.085	0.009	1.37	-	1.40
Sb	µg/kg	8.03	1.394	17.3	20	8.55	1.070	0.390	7.38	-	8.69
Sr	mg/kg	3.25	0.290	8.9	56	3.25	0.205	0.048	3.17	-	3.33
V	µg/kg	506	85.9	17.0	43	495	61.0	16.4	480	-	533
Zn	mg/kg	16.1	1.33	8.3	446	16.2	0.92	0.08	15.97	-	16.22

### Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
C - elementary	g/kg	422	14.5	3.4	117	424	10.0	1.7	419.7	-	425.0
N - elementary	g/kg	12.1	0.53	4.4	187	12.2	0.36	0.05	12.02	-	12.18

### Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Al	mg/kg	214	30.0	14.0	95	215	20.0	3.9	208	-	220



### Consensus Values IPE 160

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Crude fibre	g/kg	17.2	3.33	19.3	23	17.1	2.20	0.87	15.8	-	18.7
Total ash	g/kg	49.0	3.91	8.0	46	49.3	2.75	0.72	47.8	-	50.1



## Indicative Values IPE 160



### Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Ba	mg/kg	1.29	0.373	28.8	41	1.29	0.243	0.073	1.18	-	1.41
Cs	µg/kg	53.8	3.80	7.1	8	53.0	2.90	1.68	50.7	-	56.9
N - NH4 (as N)	mg/kg	347	61.6	17.8	11	350	40.3	23.2	306	-	387
Na	mg/kg	72.5	29.91	41.2	246	74.8	20.90	2.38	68.8	-	76.3
Se	µg/kg	22.3	6.41	28.8	42	23.0	4.65	1.24	20.3	-	24.3
SO4 (as SO4)	g/kg	1.87	0.483	25.9	12	1.88	0.301	0.174	1.56	-	2.17

### Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Al	mg/kg	278	80.2	28.8	39	300	53.8	16.1	252	-	304

### Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
delta 13C	‰ V-PDB	-27.9	0.27	1.0	12	-27.9	0.19	0.10	-28.06	-	-27.73
delta 15N	‰ Air	1.97	0.419	21.3	11	2.06	0.290	0.158	1.69	-	2.25

### Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
ADF-ash-free	g/kg	28.9	1.58	5.5	15	29.2	1.25	0.51	28.0	-	29.8
NDF-ash-free	g/kg	36.6	11.82	32.3	13	39.5	8.90	4.10	29.5	-	43.7



## Informative Values IPE 160

### Method: Inorganic Chemical Composition

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
Ag	µg/kg	6.92	3.315	8		
Bi	µg/kg	5.65	2.705	10	49.00	7
Br	mg/kg	11.4	0.90	5		
F	mg/kg	4.25	0.850	4		
Ga	µg/kg	101	5.8	7		
I	µg/kg	95.7	34.30	11		
Sn	µg/kg	63.6	27.44	18		
Ti	mg/kg	5.14	2.150	20		

### Method: Real totals

Element	Unit	Median	MAD	N
Si	mg/kg	935	480.5	6

### Method: Acid extractable (So-called totals)

Element	Unit	Median	MAD	N
Si	mg/kg	915	501.5	4

### Method: Nutritional values

Element	Unit	Median	MAD	N
NDF-ash-containing	g/kg	46.5	13.50	3
Total fat	g/kg	4.80	2.185	12