



**WAGENINGEN EVALUATING PROGRAMS  
FOR ANALYTICAL LABORATORIES**

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**Certificate of Analysis**



**International Plant-Analytical Exchange**

**REFERENCE MATERIAL**

**IPE sample 151**



## 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 151 of Grass / Poaceae from Netherlands 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
2001	3	4



## Consensus Values IPE 151



### Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
As	µg/kg	789	76.6	9.7	22	796	55.9	20.4	755	-	823
B	mg/kg	13.8	1.73	12.5	89	14.0	1.20	0.23	13.42	-	14.15
Ba	mg/kg	22.7	3.57	15.7	16	23.2	2.40	1.11	20.9	-	24.6
Ca	g/kg	8.80	0.517	5.9	131	8.82	0.361	0.056	8.72	-	8.89
Cd	µg/kg	120	15.6	13.0	42	121	11.0	3.0	115	-	125
Cl (as Cl)	g/kg	4.59	0.606	13.2	29	4.57	0.425	0.141	4.36	-	4.82
Co	µg/kg	623	97.1	15.6	32	616	66.5	21.5	588	-	658
Cu	mg/kg	9.46	1.119	11.8	128	9.61	0.785	0.124	9.26	-	9.65
Fe	mg/kg	1200	165	13.7	122	1200	114	19	1175	-	1234
Hg	µg/kg	8.59	1.205	14.0	26	8.75	0.875	0.295	8.10	-	9.08
K	g/kg	22.7	1.45	6.4	130	22.7	0.99	0.16	22.41	-	22.91
Mg	g/kg	3.54	0.247	7.0	131	3.55	0.170	0.027	3.50	-	3.59
Mn	mg/kg	92.3	7.31	7.9	132	92.1	4.95	0.79	91.1	-	93.6
Mo	µg/kg	2410	239	9.9	31	2370	162	54	2324	-	2499
N - Kjeldahl (as N)	g/kg	21.7	1.20	5.5	77	21.7	0.83	0.17	21.40	-	21.94
Na	mg/kg	269	62.3	23.2	84	279	43.7	8.5	255	-	282
Ni	µg/kg	3370	529	15.7	46	3410	351	97	3215	-	3529
P (as P)	g/kg	3.97	0.201	5.1	127	3.95	0.139	0.022	3.93	-	4.01
Pb	µg/kg	888	180.6	20.3	41	890	120.0	35.2	831	-	945
S (as S)	g/kg	2.05	0.147	7.2	71	2.06	0.103	0.022	2.02	-	2.09
Zn	mg/kg	31.5	2.71	8.6	132	31.6	1.90	0.29	31.0	-	31.9

### Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
C - elementary	g/kg	429	17.7	4.1	19	427	12.0	5.1	420	-	437
N - elementary	g/kg	22.4	0.95	4.2	45	22.4	0.69	0.18	22.14	-	22.71



## Indicative Values IPE 151

### Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Be	µg/kg	23.6	8.89	37.7	8	23.3	5.75	3.93	16.3	-	30.8
Cr	µg/kg	4180	1469	35.1	41	4270	1000	287	3720	-	4640
N - NO3 (as N)	mg/kg	161	31.4	19.5	12	161	21.7	11.3	141	-	181
Se	µg/kg	53.0	7.35	13.9	12	55.1	5.50	2.65	48.4	-	57.6
Sr	mg/kg	23.1	2.45	10.6	13	23.5	1.80	0.85	21.6	-	24.6
V	µg/kg	2160	611	28.3	13	2220	421	212	1792	-	2524

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Al	mg/kg	726	243.5	33.5	34	769	179.6	52.2	641	-	811



## Informative Values IPE 151



### Method: Inorganic Chemical Composition

Element	Unit	Median	MAD	N
Li	µg/kg	1340	272	5
N - NH4 (as N)	mg/kg	217	149.9	3
Rb	µg/kg	86900	4540	3
Sb	µg/kg	31.6	3.80	7
SO4 (as SO4)	g/kg	2.77	0.538	6

### Method: Real totals

Element	Unit	Median	MAD	N
Al	mg/kg	1420	480	7

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

Element	Unit	Median	MAD	N
Si	mg/kg	4140	3845	4

### Method: Nutritional values

Element	Unit	Median	MAD	N
Crude fibre	g/kg	240	0.5	4
Total ash	g/kg	106	3.3	6
Total fat	g/kg	21.0	9.75	4