



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 884



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 884 of Yam / Dioscorea 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
1999	2	4
1998	3	6
1996	2	2
1992	1	4



Consensus Values IPE 884



Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
As	µg/kg	257	44.7	17.4	51	259	30.0	7.8	244	-	270
B	mg/kg	37.2	3.70	9.9	304	37.1	2.60	0.27	36.8	-	37.6
Ba	mg/kg	11.4	1.51	13.2	38	11.3	1.07	0.31	10.9	-	11.9
Ca	g/kg	21.8	1.51	7.0	492	21.8	1.04	0.09	21.62	-	21.89
Cd	µg/kg	1100	144	13.1	128	1110	100	16	1071	-	1121
Cl (as Cl)	g/kg	2.67	0.315	11.8	106	2.66	0.211	0.038	2.61	-	2.73
Cr	µg/kg	1270	281	22.1	92	1280	195	37	1210	-	1326
Cu	mg/kg	6.95	1.004	14.5	459	7.00	0.700	0.059	6.86	-	7.04
Fe	mg/kg	120	15.6	13.0	444	121	10.8	0.9	118.6	-	121.5
Hg	µg/kg	17.1	4.00	23.4	50	17.1	2.85	0.71	16.0	-	18.2
K	g/kg	15.3	1.03	6.7	507	15.3	0.71	0.06	15.26	-	15.44
Mg	g/kg	3.22	0.198	6.1	493	3.21	0.139	0.011	3.20	-	3.24
Mn	mg/kg	220	22.3	10.1	476	220	15.0	1.3	218.1	-	222.1
Mo	µg/kg	2120	271	12.8	77	2140	191	39	2062	-	2185
N - Kjeldahl (as N)	g/kg	16.2	0.91	5.6	366	16.2	0.62	0.06	16.07	-	16.25
N - NO3 (as N)	mg/kg	1120	84	7.5	69	1110	57	13	1100	-	1140
Ni	µg/kg	917	154.3	16.8	94	911	101.5	19.9	885	-	949
P (as P)	g/kg	3.60	0.273	7.6	504	3.59	0.186	0.015	3.57	-	3.62
Pb	µg/kg	2530	392	15.5	124	2550	270	44	2458	-	2598
S (as S)	g/kg	1.80	0.142	7.9	210	1.80	0.098	0.012	1.78	-	1.82
SO4 (as SO4)	g/kg	2.70	0.373	13.8	20	2.75	0.245	0.104	2.53	-	2.87
Sr	mg/kg	51.2	4.38	8.6	39	50.7	3.10	0.88	49.8	-	52.7
Zn	mg/kg	81.1	7.33	9.0	474	80.8	5.06	0.42	80.5	-	81.8

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
C - elementary	g/kg	439	17.8	4.1	30	440	12.4	4.1	432	-	445
N - elementary	g/kg	17.1	1.02	6.0	137	17.0	0.70	0.11	16.89	-	17.23



Indicative Values IPE 884



Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Co	µg/kg	69.2	34.07	49.3	53	78.0	25.00	5.85	59.8	-	78.5
F	mg/kg	2.68	0.738	27.5	10	2.80	0.545	0.292	2.16	-	3.20
Li	µg/kg	988	308.4	31.2	18	1000	217.5	90.9	836	-	1141
N - NH4 (as N)	mg/kg	64.3	25.74	40.0	9	68.8	17.23	10.72	44.9	-	83.7
Na	mg/kg	142	45.3	31.9	317	147	32.0	3.2	137	-	147
Rb	µg/kg	18400	910	4.9	8	18500	580	400	17620	-	19100
Sb	µg/kg	42.4	6.48	15.3	11	44.0	5.00	2.44	38.1	-	46.7
Se	µg/kg	41.5	13.52	32.6	25	45.0	10.00	3.38	35.9	-	47.0
V	µg/kg	165	47.5	28.7	26	172	33.5	11.7	146	-	185

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Crude fibre	g/kg	312	14.0	4.5	9	311	10.0	5.8	301	-	322
Total ash	g/kg	92.0	6.63	7.2	14	90.5	4.90	2.21	88.2	-	95.8



Informative Values IPE 884



Method: Inorganic Chemical Composition

Element	Unit	Median	MAD	N
Be	µg/kg	10.00	5.000	7
Br	mg/kg	50.6	3.30	7
Ti	mg/kg	1.70	0.200	7

Results smaller than (<)

Median of <	N
10.00	8

Method: Nutritional values

Element	Unit	Median	MAD	N
ADF-ash-free	g/kg	207	181.0	4
NDF-ash-free	g/kg	247	220.1	4
Total fat	g/kg	22.8	3.20	3