



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 219



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 219 of Sorghum / Sorghum bicolor L., from Austria, is prepared for the WEPAL proficiency programs. The sample has been 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
2014	2	2



Consensus Values IPE 219



Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	2.95	0.820	27.8	70	3.00	0.492	0.123	4.16
Cu	mg/kg	2.30	0.446	19.4	102	2.37	0.314	0.055	2.40
Fe	mg/kg	104	12.5	11.9	102	105	8.20	1.54	1.48
Mn	mg/kg	19.2	2.20	11.5	103	19.1	1.45	0.271	1.41
Zn	mg/kg	12.3	1.54	12.5	103	12.5	0.800	0.190	1.54
Cd	µg/kg	55.4	9.93	17.9	28	55.3	4.75	2.35	4.24
Cr	µg/kg	305	64.0	21.0	20	306	41.8	17.9	5.87
Mo	µg/kg	216	35.7	16.6	26	218	25.0	8.76	4.06
Pb	µg/kg	153	23.1	15.1	22	161	17.9	6.16	4.03
Ba	mg/kg	4.13	0.627	15.2	10	4.10	0.283	0.248	6.00
Sr	mg/kg	9.06	1.23	13.5	12	9.06	0.615	0.443	4.88
Ca	g/kg	2.80	0.203	7.3	110	2.80	0.124	0.024	0.864
Cl (as Cl)	g/kg	2.05	0.199	9.7	20	2.04	0.115	0.056	2.70
K	g/kg	9.48	0.606	6.4	113	9.50	0.390	0.071	0.751
Mg	g/kg	1.03	0.084	8.1	113	1.03	0.056	0.010	0.955
N - Kjeldahl (as N)	g/kg	4.95	0.412	8.3	68	4.95	0.250	0.062	1.26
P (as P)	g/kg	1.24	0.080	6.5	114	1.24	0.050	0.009	0.759
S (as S)	g/kg	0.678	0.065	9.5	64	0.680	0.040	0.010	1.49

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	448	12.2	2.7	45	445	7.95	2.28	0.509
N - elementary	g/kg	5.26	0.499	9.5	61	5.28	0.280	0.080	1.52

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-12.0	0.429	3.6	12	-12.0	0.248	0.155	1.29
delta 15N	‰ Air	1036	22.5	2.2	13	1033	12.5	7.79	0.752

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total ash	g/kg	42.1	1.46	3.5	11	41.7	1.20	0.550	1.30



Indicative Values IPE 219

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	µg/kg	43.7	12.5	28.6	18	46.0	7.28	3.69	8.43
Co	µg/kg	38.2	12.0	31.5	18	37.9	6.15	3.54	9.27
Hg	µg/kg	2.00	0.538	26.9	9	2.11	0.330	0.224	11.2
Ni	µg/kg	254	94.4	37.1	17	262	58.2	28.6	11.3
Se	µg/kg	28.0	13.2	47.3	9	32.2	8.02	5.51	19.7
Sb	µg/kg	9.52	1.68	17.6	7	9.41	1.19	0.793	8.33
Sn	µg/kg	30.3	15.7	52.0	4	32.8	7.26	9.84	32.5
Ti	mg/kg	1.12	0.605	53.8	9	1.26	0.386	0.252	22.4
V	µg/kg	101	17.2	17.0	11	101	12.0	6.47	6.42
N - NO3 (as N)	mg/kg	22.8	8.47	37.2	9	24.1	3.60	3.53	15.5
Na	mg/kg	17.5	18.6	106.2	48	17.7	12.5	3.36	19.2
SO4 (as SO4)	g/kg	0.565	0.315	55.7	5	0.500	0.180	0.176	31.1

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	66.1	23.0	34.8	8	67.6	18.4	10.2	15.4

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	46.2	18.0	39.1	25	50.5	12.1	4.51	9.77

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	297	23.8	8.0	4	296	11.7	14.9	5.02