



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 208



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 208 of Alfalfa / Medicago sativa, 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
2012	2	2



Consensus Values IPE 208



Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	39.5	3.99	10.1	77	39.2	2.46	0.569	1.44
Cu	mg/kg	8.20	0.793	9.7	97	8.23	0.530	0.101	1.23
Fe	mg/kg	528	63.5	12.0	97	526	44.0	8.05	1.52
Mn	mg/kg	43.7	3.61	8.2	99	43.7	2.33	0.453	1.04
Zn	mg/kg	20.0	2.15	10.8	99	20.1	1.31	0.271	1.36
Cd	µg/kg	76.6	13.6	17.8	28	76.0	7.75	3.21	4.20
Co	µg/kg	254	33.6	13.2	24	255	22.2	8.57	3.38
Cr	µg/kg	1282	309	24.1	25	1325	207	77.3	6.03
Hg	µg/kg	10.1	1.12	11.1	14	10.2	0.649	0.374	3.72
Mo	µg/kg	1324	142	10.7	29	1324	82.6	33.0	2.49
Pb	µg/kg	554	80.9	14.6	27	550	61.0	19.5	3.51
Ba	mg/kg	12.9	1.74	13.5	8	12.7	1.19	0.770	5.95
Sr	mg/kg	49.6	2.80	5.7	11	49.8	2.06	1.06	2.13
Ca	g/kg	19.8	1.27	6.4	107	19.8	0.810	0.153	0.772
Cl (as Cl)	g/kg	7.77	0.255	3.3	19	7.75	0.150	0.073	0.942
K	g/kg	20.5	1.40	6.8	108	20.6	0.900	0.168	0.819
Mg	g/kg	3.23	0.223	6.9	108	3.21	0.155	0.027	0.832
N - Kjeldahl (as N)	g/kg	31.2	1.82	5.8	72	31.4	1.26	0.268	0.859
N - NO3 (as N)	mg/kg	210	16.3	7.8	9	209	8.00	6.79	3.24
Na	mg/kg	752	61.8	8.2	56	757	42.9	10.3	1.37
P (as P)	g/kg	2.58	0.186	7.2	106	2.57	0.131	0.023	0.877
S (as S)	g/kg	3.07	0.221	7.2	58	3.05	0.155	0.036	1.18

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	445	13.1	2.9	40	446	7.86	2.59	0.581
N - elementary	g/kg	32.9	1.22	3.7	59	32.9	0.800	0.199	0.605

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
delta 13C	‰ V-PDB	-30.2	0.420	1.4	11	-30.1	0.270	0.158	0.523
delta 15N	‰ Air	771	22.9	3.0	14	773	8.50	7.64	0.990

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total ash	g/kg	106	4.78	4.5	10	106	3.46	1.89	1.79



Indicative Values IPE 208

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
F	mg/kg	8.29	4.10	49.4	4	8.29	2.91	2.56	30.9
As	µg/kg	336	91.9	27.4	19	341	42.0	26.4	7.85
Li	µg/kg	664	186	28.0	5	713	115	104	15.7
Ni	µg/kg	1047	275	26.3	21	1040	165	75.0	7.16
Se	µg/kg	88.4	23.7	26.8	13	92.0	14.0	8.22	9.30
Sb	µg/kg	33.3	2.40	7.2	7	32.8	7.20	1.13	3.41
Sn	µg/kg	63.2	13.1	20.8	6	66.8	7.15	6.71	10.6
Ti	mg/kg	13.0	5.09	39.2	4	14.2	2.71	3.18	24.5
V	µg/kg	1062	254	23.9	13	1060	160	88.1	8.30
Be	µg/kg	24.5	6.45	26.3	8	24.8	3.01	2.85	11.6
Rb	µg/kg	5764	710	12.3	5	5800	430	397	6.89

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	776	351	45.2	12	814	177	127	16.3

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	582	166	28.5	18	591	109	49.0	8.41

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	239	31.6	13.2	5	241	11.3	17.7	7.40
Total fat	g/kg	22.1	9.71	43.8	4	22.5	5.19	6.07	27.4