



**WAGENINGEN EVALUATING PROGRAMS  
FOR ANALYTICAL LABORATORIES**

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**Certificate of Analysis**



**International Plant-Analytical Exchange**

**REFERENCE MATERIAL**

**IPE sample 904**

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## 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 904 of Broadbeans (bark) / *Vicia faba* from Netherlands is prepared for the WEPAL proficiency programs. The sample is used in 3 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
1997	2	3
1996	5	6
1994	5	6



## Consensus Values IPE 904



### Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
As	µg/kg	127	22.4	17.6	34	130	16.0	4.8	119	-	135
B	mg/kg	24.2	2.36	9.8	212	24.4	1.60	0.20	23.87	-	24.51
Ba	mg/kg	3.26	0.769	23.6	25	3.38	0.550	0.192	2.95	-	3.58
Ca	g/kg	2.99	0.251	8.4	396	3.00	0.176	0.016	2.96	-	3.01
Cl (as Cl)	g/kg	3.61	0.312	8.7	73	3.62	0.216	0.046	3.54	-	3.68
Co	µg/kg	158	32.6	20.7	37	160	21.0	6.7	147	-	169
Cr	µg/kg	701	168.7	24.1	68	696	109.0	25.6	660	-	742
Cu	mg/kg	6.08	0.969	15.9	354	6.10	0.670	0.064	5.98	-	6.18
Fe	mg/kg	265	33.3	12.6	356	265	22.5	2.2	261.1	-	268.1
K	g/kg	28.6	1.77	6.2	410	28.7	1.21	0.11	28.41	-	28.75
Mg	g/kg	1.81	0.133	7.3	395	1.80	0.092	0.008	1.80	-	1.82
Mn	mg/kg	25.4	2.72	10.7	378	25.2	1.90	0.17	25.11	-	25.66
Mo	µg/kg	2880	322	11.2	50	2950	226	57	2785	-	2968
N - Kjeldahl (as N)	g/kg	24.8	1.42	5.7	275	24.8	0.98	0.11	24.64	-	24.98
Na	mg/kg	250	59.4	23.8	262	252	41.7	4.6	243	-	257
Ni	µg/kg	1300	237	18.3	66	1300	166	36	1238	-	1355
P (as P)	g/kg	3.16	0.203	6.4	389	3.16	0.141	0.013	3.14	-	3.18
S (as S)	g/kg	1.15	0.114	9.9	153	1.15	0.079	0.012	1.13	-	1.17
Sr	mg/kg	8.89	0.846	9.5	31	8.86	0.590	0.190	8.58	-	9.20
V	µg/kg	476	85.8	18.0	25	487	57.0	21.4	441	-	512
Zn	mg/kg	30.3	3.42	11.3	374	30.4	2.35	0.22	29.93	-	30.62

### Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
N - elementary	g/kg	25.8	1.28	5.0	106	25.8	0.88	0.16	25.51	-	26.01



## Indicative Values IPE 904



### Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Be	µg/kg	14.2	4.63	32.7	12	14.9	3.35	1.67	11.2	-	17.1
Cd	µg/kg	34.9	16.25	46.6	69	36.0	11.30	2.45	31.0	-	38.8
Hg	µg/kg	3.72	1.432	38.5	32	4.00	1.000	0.316	3.21	-	4.24
Li	µg/kg	425	103.7	24.4	9	420	72.0	43.2	347	-	504
Pb	µg/kg	819	248.0	30.3	81	839	175.0	34.4	764	-	874
Sb	µg/kg	30.3	11.16	36.8	14	32.3	8.10	3.73	23.9	-	36.7
SO4 (as SO4)	g/kg	1.40	0.272	19.4	12	1.42	0.192	0.098	1.23	-	1.57



### Informative Values IPE 904

#### Method: Inorganic Chemical Composition

Element	Unit	Median	MAD	N	Results smaller than (<) Median of <	N
Br	mg/kg	11.6	0.50	5		
F	mg/kg	4.00	0.630	7		
N - NH4 (as N)	mg/kg	217	76.1	8		
N - NO3 (as N)	mg/kg	11.84	5.744	30	42.03	11
Rb	µg/kg	5470	370	4		
Se	µg/kg	22.5	7.30	16	1000.0	15
Ti	mg/kg	3.81	2.310	9		

#### Method: Real totals

Element	Unit	Median	MAD	N
C - elementary	g/kg	411	10.8	7