



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Plant-Analytical Exchange

REFERENCE MATERIAL

IPE sample 143



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 143 of Valerian Root / *Valeriana officinalis*, from Netherlands, 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
2003	4	3



Consensus Values IPE 143

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	15.5	3.43	22.1	88	15.7	2.35	0.457	2.94
Cu	mg/kg	10.2	1.24	12.1	127	10.2	0.700	0.137	1.34
Fe	mg/kg	2950	487	16.5	122	2953	296	55.1	1.87
Mn	mg/kg	69.1	6.38	9.2	134	69.2	3.95	0.689	0.998
Zn	mg/kg	57.9	4.59	7.9	136	58.2	2.95	0.492	0.850
As	µg/kg	1081	192	17.8	29	1093	111	44.7	4.13
Cd	µg/kg	154	24.9	16.1	51	156	16.0	4.35	2.82
Co	µg/kg	327	75.1	23.0	26	320	48.0	18.4	5.63
Cr	µg/kg	2525	642	25.4	47	2570	391	117	4.63
Mo	µg/kg	424	47.0	11.1	25	426	24.0	11.8	2.77
Ni	µg/kg	1684	297	17.6	48	1655	198	53.5	3.18
Pb	µg/kg	2720	420	15.5	58	2726	265	69.0	2.54
Ba	mg/kg	17.5	2.53	14.5	11	17.8	1.57	0.952	5.45
Sr	mg/kg	14.4	1.07	7.4	12	14.4	0.600	0.385	2.68
Ca	g/kg	2.23	0.203	9.1	140	2.23	0.132	0.021	0.964
Cl (as Cl)	g/kg	1.57	0.414	26.4	31	1.61	0.308	0.093	5.92
K	g/kg	21.7	1.08	5.0	139	21.8	0.743	0.115	0.529
Mg	g/kg	1.85	0.114	6.2	143	1.85	0.070	0.012	0.646
N - Kjeldahl (as N)	g/kg	31.5	1.69	5.4	90	31.4	1.02	0.222	0.707
Na	mg/kg	471	66.5	14.1	94	483	47.1	8.58	1.82
P (as P)	g/kg	5.78	0.462	8.0	137	5.76	0.279	0.049	0.854
S (as S)	g/kg	2.12	0.160	7.5	73	2.13	0.077	0.023	1.10

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C - elementary	g/kg	429	10.2	2.4	21	429	5.00	2.77	0.646
N - elementary	g/kg	33.3	1.91	5.7	47	33.3	1.20	0.348	1.05

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	657	78.0	11.9	35	639	41.0	16.5	2.51

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total ash	g/kg	112	10.2	9.1	8	110	5.25	4.51	4.02



Indicative Values IPE 143

Method: Inorganic Chemical Composition

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Hg	µg/kg	9.59	3.09	32.2	25	10.2	1.92	0.773	8.06
Li	µg/kg	389	63.0	16.2	4	407	33.5	39.4	10.1
Se	µg/kg	69.9	14.5	20.7	10	70.7	10.0	5.73	8.19
Sb	µg/kg	77.7	16.1	20.7	5	79.9	8.80	8.98	11.6
V	µg/kg	3117	584	18.7	11	3080	338	220	7.06
Be	µg/kg	19.6	3.58	18.3	5	20.8	1.00	2.00	10.2
Rb	µg/kg	9134	967	10.6	4	9377	516	604	6.62
N - NO3 (as N)	mg/kg	79.6	41.4	52.0	15	82.1	19.5	13.4	16.8
SO4 (as SO4)	g/kg	2.32	0.318	13.7	6	2.25	0.130	0.162	6.98

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	1334	195	14.6	5	1330	108	109	8.16

Method: Nutritional values

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Crude fibre	g/kg	97.1	21.2	21.8	5	94.5	14.5	11.8	12.2