



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Soil-Analytical Exchange

REFERENCE MATERIAL

ISE sample 848



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 ISE samples are dried at 40°C and milled to pass a 0.5 mm sieve.

This ISE sample 848 of Clay, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 9 periods (or rounds). Only results from the last 5 periods are used. This way, the consensus values reflect the latest 'state of the art' analytical techniques used by the laboratories. The results on which the values in this report are based were taken from the periods given in the following table:

Year	Round	Number
2023	4	3
2023	3	4
2023	2	1
2023	1	2
2020	1	1



Consensus Values ISE 848



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	51.2	1.78	3.5	73	51.1	1.00	0.261	0.510
As	mg/kg	10.8	1.40	12.9	69	11.0	0.970	0.210	1.95
Ba	mg/kg	451	32.9	7.3	68	448	18.4	4.99	1.11
Br	mg/kg	7.20	1.16	16.2	34	7.35	0.750	0.249	3.46
Ca	g/kg	17.4	0.886	5.1	84	17.4	0.578	0.121	0.695
Cd	mg/kg	0.585	0.101	17.2	28	0.595	0.062	0.024	4.07
Co	mg/kg	11.4	2.06	18.0	62	11.4	1.07	0.327	2.86
Cr	mg/kg	81.6	8.91	10.9	82	81.0	4.90	1.23	1.51
Cu	mg/kg	31.8	4.04	12.7	78	32.0	2.25	0.572	1.80
Fe	g/kg	25.4	1.16	4.6	86	25.4	0.642	0.156	0.614
Ga	mg/kg	12.0	2.11	17.6	40	12.0	1.40	0.417	3.48
K	mg/kg	19073	1071	5.6	96	18922	640	137	0.716
Mg	mg/kg	6985	495	7.1	78	6990	300	70.1	1.00
Mn	mg/kg	1323	84.9	6.4	80	1317	53.1	11.9	0.897
Mo	mg/kg	0.687	0.163	23.7	25	0.700	0.100	0.041	5.93
Na	mg/kg	7304	468	6.4	66	7232	292	72.0	0.986
Ni	mg/kg	36.6	3.91	10.7	83	36.1	2.30	0.537	1.47
P	mg/kg	2675	256	9.6	78	2630	150	36.2	1.35
Pb	mg/kg	41.3	5.57	13.5	78	41.1	3.10	0.788	1.91
Rb	mg/kg	109	5.63	5.2	49	109	3.00	1.01	0.924
S	mg/kg	256	96.0	37.5	82	274	58.5	13.2	5.17
Si	g/kg	333	11.5	3.5	69	333	6.35	1.73	0.521
Sn	mg/kg	3.15	0.798	25.3	35	3.30	0.618	0.169	5.35
Sr	mg/kg	116	6.05	5.2	60	117	3.75	0.977	0.841
Y	mg/kg	25.1	1.86	7.4	50	25.0	1.00	0.329	1.31
Zn	mg/kg	146	7.80	5.3	88	147	4.65	1.04	0.711
Zr	mg/kg	269	11.4	4.2	40	270	6.50	2.25	0.836
C-elementary	g/kg	17.9	0.827	4.6	155	17.9	0.530	0.083	0.465
Sb	mg/kg	1.00	0.215	21.5	28	1.03	0.116	0.051	5.08
Be	mg/kg	1.81	0.350	19.4	15	1.80	0.169	0.113	6.25
Tl	mg/kg	0.635	0.128	20.1	19	0.660	0.100	0.037	5.77
V	mg/kg	61.1	5.24	8.6	76	61.0	3.03	0.752	1.23
Ti	mg/kg	3192	181	5.7	70	3197	120	27.0	0.847
N - elementary	g/kg	1.37	0.123	9.0	259	1.37	0.070	0.010	0.701
Ce	mg/kg	63.2	5.89	9.3	40	63.1	2.91	1.16	1.84
La	mg/kg	30.9	2.53	8.2	35	30.9	1.90	0.534	1.73
Nb	mg/kg	12.2	0.990	8.1	36	12.2	0.750	0.206	1.69



Consensus Values ISE 848



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Nd	mg/kg	28.2	2.90	10.3	29	28.2	1.38	0.672	2.39
Sc	mg/kg	9.25	1.78	19.2	22	9.00	1.05	0.473	5.12
Th	mg/kg	9.35	0.716	7.7	32	9.30	0.357	0.158	1.69
U	mg/kg	2.52	0.568	22.5	24	2.58	0.401	0.145	5.74
Hg	µg/kg	76.1	6.20	8.1	63	76.8	4.00	0.976	1.28

(cont.)

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	19.3	3.86	20.0	51	19.6	2.44	0.675	3.51
As	mg/kg	9.05	1.28	14.2	91	9.04	0.830	0.168	1.86
Ba	mg/kg	201	16.1	8.0	60	200	9.40	2.60	1.29
Ca	g/kg	15.7	1.34	8.5	59	15.7	0.890	0.218	1.38
Cd	mg/kg	0.549	0.072	13.1	96	0.549	0.042	0.009	1.67
Co	mg/kg	10.5	0.976	9.3	89	10.4	0.670	0.129	1.23
Cr	mg/kg	40.9	6.80	16.6	104	41.1	4.21	0.834	2.04
Cu	mg/kg	29.7	2.70	9.1	108	29.8	1.70	0.325	1.10
Fe	g/kg	22.0	2.04	9.3	57	21.9	1.44	0.337	1.53
K	mg/kg	4787	1431	29.9	58	4863	1026	235	4.91
Li	mg/kg	27.1	4.94	18.2	17	26.6	2.82	1.50	5.52
Mg	mg/kg	5717	493	8.6	57	5688	288	81.6	1.43
Mn	mg/kg	1278	84.3	6.6	68	1281	48.5	12.8	1.000
Mo	mg/kg	0.481	0.129	26.8	38	0.512	0.074	0.026	5.44
N	g/kg	1.36	0.182	13.4	126	1.36	0.111	0.020	1.49
Na	mg/kg	178	61.7	34.8	49	187	41.4	11.0	6.21
Ni	mg/kg	32.7	2.91	8.9	100	32.5	1.67	0.364	1.12
P	mg/kg	2476	219	8.9	80	2466	133	30.7	1.24
Pb	mg/kg	35.5	4.90	13.8	104	35.2	2.90	0.601	1.69
S	mg/kg	250	29.2	11.7	58	250	19.1	4.79	1.92
Sr	mg/kg	55.1	4.80	8.7	20	55.0	2.36	1.34	2.44
Zn	mg/kg	138	11.1	8.0	108	137	7.99	1.33	0.966
V	mg/kg	32.6	5.91	18.2	60	32.6	3.37	0.954	2.93
Be	mg/kg	1.02	0.097	9.6	48	1.03	0.059	0.018	1.73
Ag	mg/kg	0.086	0.012	13.6	9	0.088	0.008	0.005	5.66
La	mg/kg	16.3	2.34	14.3	9	16.6	1.15	0.973	5.96
Hg	µg/kg	73.8	13.7	18.5	63	74.9	7.90	2.16	2.92



Consensus Values ISE 848



Method: Aqua Regia (ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ag	µg/kg	80.9	9.68	12.0	12	80.5	4.55	3.49	4.32
Al	g/kg	18.0	2.92	16.2	105	18.0	1.94	0.356	1.98
As	mg/kg	9.19	0.729	7.9	106	9.19	0.451	0.089	0.964
Ba	mg/kg	200	20.2	10.1	40	201	11.2	3.99	1.99
Be	mg/kg	1.06	0.078	7.3	38	1.07	0.043	0.016	1.49
Bi	mg/kg	0.209	0.025	12.0	10	0.210	0.012	0.010	4.73
Ca	g/kg	15.7	1.04	6.6	92	15.6	0.696	0.136	0.867
Cd	mg/kg	0.559	0.081	14.5	130	0.567	0.047	0.009	1.59
Co	mg/kg	10.5	0.942	9.0	100	10.5	0.550	0.118	1.12
Cr	mg/kg	40.4	5.21	12.9	146	40.6	3.09	0.539	1.33
Cu	mg/kg	30.6	2.60	8.5	149	30.6	1.60	0.266	0.869
Fe	g/kg	22.5	1.86	8.3	119	22.4	1.00	0.213	0.947
Hg	µg/kg	77.1	9.81	12.7	61	77.7	6.15	1.57	2.03
K	mg/kg	4819	875	18.2	92	4880	475	114	2.37
Li	mg/kg	26.6	3.78	14.2	22	27.1	2.46	1.01	3.79
Mg	mg/kg	5765	439	7.6	104	5748	260	53.8	0.933
Mn	mg/kg	1258	93.8	7.5	122	1250	55.5	10.6	0.844
Mo	mg/kg	0.516	0.091	17.6	57	0.528	0.052	0.015	2.91
Na	mg/kg	159	36.4	22.9	78	160	22.5	5.16	3.25
Ni	mg/kg	32.8	2.84	8.7	147	32.5	1.71	0.293	0.893
P	mg/kg	2503	195	7.8	88	2504	116	26.0	1.04
Pb	mg/kg	35.1	4.95	14.1	154	35.1	3.10	0.499	1.42
S	mg/kg	249	21.9	8.8	71	254	14.0	3.25	1.30
Sb	mg/kg	0.584	0.082	14.0	31	0.591	0.059	0.018	3.14
Sn	mg/kg	1.80	0.247	13.8	28	1.80	0.125	0.058	3.26
Sr	mg/kg	55.9	6.93	12.4	27	56.4	4.10	1.67	2.99
Ti	mg/kg	282	51.6	18.3	31	281	31.8	11.6	4.11
Tl	mg/kg	0.210	0.034	16.3	29	0.210	0.026	0.008	3.79
U	mg/kg	0.823	0.058	7.1	23	0.818	0.032	0.015	1.85
V	mg/kg	33.5	4.34	13.0	60	33.9	2.60	0.700	2.09
Zn	mg/kg	139	10.3	7.4	155	138	6.27	1.03	0.741

Method: Extraction with boiling 2M HNO3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cd	mg/kg	0.575	0.040	7.0	78	0.573	0.025	0.006	0.990
Co	mg/kg	9.90	0.567	5.7	69	9.82	0.380	0.085	0.863
Cr	mg/kg	23.5	1.62	6.9	83	23.3	1.00	0.222	0.946



Consensus Values ISE 848



Method: Extraction with boiling 2M HNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	mg/kg	29.9	2.26	7.6	81	30.0	1.33	0.314	1.05
Hg	µg/kg	69.2	7.61	11.0	64	69.6	4.14	1.19	1.72
Mo	mg/kg	0.177	0.045	25.5	44	0.188	0.028	0.009	4.80
Ni	mg/kg	28.3	2.07	7.3	83	28.2	1.40	0.285	1.01
Pb	mg/kg	35.9	3.72	10.4	82	35.8	2.38	0.514	1.43
Tl	mg/kg	0.106	0.011	10.7	30	0.105	0.007	0.003	2.45
Zn	mg/kg	133	8.10	6.1	82	133	4.30	1.12	0.839

(cont.)

Method: Extraction with 0.1M NaNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	µg/kg	157	11.7	7.4	26	155	4.77	2.86	1.83
Ni	µg/kg	37.4	3.61	9.6	24	38.0	1.97	0.920	2.46

Method: Extraction with 0.01M CaCl₂ 1:10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	µg/kg	260	35.4	13.6	20	260	22.1	9.90	3.81
Cu	µg/kg	151	28.3	18.8	20	147	16.6	7.91	5.26
K	mg/kg	326	17.3	5.3	35	322	11.8	3.66	1.12
Mg	mg/kg	190	7.91	4.2	26	191	4.43	1.94	1.02
Mn	mg/kg	4.22	0.485	11.5	21	4.29	0.290	0.132	3.14
N total soluble	mg/kg	40.8	2.13	5.2	8	40.2	1.25	0.943	2.31
N - NH ₄ (as N)	mg/kg	7.37	1.19	16.2	39	7.34	0.750	0.238	3.23
N - NO ₃ (as N)	mg/kg	17.8	0.733	4.1	36	17.7	0.500	0.153	0.860
Na	mg/kg	25.7	1.81	7.0	30	26.0	1.09	0.413	1.61
P	mg/kg	9.84	1.03	10.5	37	9.70	0.700	0.212	2.15
SO ₄	mg/kg	61.9	4.03	6.5	10	61.3	1.50	1.59	2.57

Method: Soil characteristics

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pH - H ₂ O	...	7.64	0.237	3.1	453	7.64	0.150	0.014	0.182
pH - KCl	...	7.19	0.190	2.6	204	7.19	0.115	0.017	0.231
pH - CaCl ₂	...	7.12	0.139	2.0	144	7.10	0.090	0.014	0.203
Fraction < 2 µm	%	21.9	4.35	19.8	134	21.7	2.77	0.469	2.14
TIC=Tot.Inorg C(as CaCO ₃)	%	2.49	0.988	39.7	163	2.50	0.550	0.097	3.89
EC-SC (ISO 11265)	mS/m	19.2	2.44	12.7	195	19.3	1.53	0.218	1.14
Fraction < 63 µm	%	69.5	4.13	5.9	89	69.4	2.40	0.547	0.786
Fraction > 63 µm	%	30.5	3.25	10.6	79	30.5	2.16	0.457	1.50



Consensus Values ISE 848



Method: Soil characteristics									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Org.matter (L.O.I.)	%	3.93	0.512	13.0	180	3.90	0.301	0.048	1.21
Fraction < 16 µm	%	45.0	7.76	17.3	42	43.5	5.41	1.50	3.33
TC=Total C (org.+inorg.)	g/kg	17.7	1.04	5.8	218	17.7	0.553	0.088	0.495
TOC=Total Org. C	g/kg	13.6	1.77	13.0	237	13.6	1.16	0.143	1.05
C - org others (W&B a.o.)	g/kg	11.0	1.89	17.2	224	11.1	1.14	0.158	1.44
Method: Other determinations									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Moisture-content	%	1.86	0.303	16.3	198	1.90	0.180	0.027	1.44
delta 13C	‰ V-PDB	-21.6	0.415	1.9	14	-21.5	0.220	0.139	0.643
delta 15N	‰ Air	8.97	0.291	3.2	14	9.02	0.215	0.097	1.08
Method: Fluoride (Swiss standard procedure)									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
F - Total	mg/kg	386	54.6	14.1	15	384	32.4	17.6	4.56
Method: Pot. CEC using 1M NH4-acetate at pH=7									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	14.9	2.79	18.7	154	15.0	1.70	0.281	1.88
Na	cmol+/kg	0.141	0.039	27.8	218	0.142	0.022	0.003	2.35
K	cmol+/kg	1.59	0.189	11.9	259	1.59	0.111	0.015	0.924
Mg	cmol+/kg	2.46	0.352	14.3	257	2.46	0.210	0.027	1.12
Ca	cmol+/kg	22.7	6.10	26.9	246	22.4	3.95	0.487	2.15
Method: Pot. CEC using 1M or 0.1M BaCl2-TEA at pH=8.1 (ISO 13536 OR BZE)									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	19.9	2.32	11.6	20	20.0	1.34	0.648	3.25
Method: Pot. CEC using 1M NH4Cl (BZE)									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
K	cmol+/kg	1.71	0.173	10.1	14	1.71	0.100	0.058	3.37
Mg	cmol+/kg	2.42	0.243	10.0	14	2.44	0.132	0.081	3.35
Ca	cmol+/kg	18.0	2.39	13.3	14	18.7	1.35	0.800	4.44



Consensus Values ISE 848



Method: Act. CEC using cobaltihexamine (AFNOR NFX 31 130)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	16.6	1.43	8.6	46	16.7	0.827	0.264	1.59
Na	cmol+/kg	0.121	0.019	15.5	31	0.122	0.010	0.004	3.48
K	cmol+/kg	1.82	0.139	7.6	33	1.80	0.087	0.030	1.66
Ca	cmol+/kg	13.4	1.10	8.2	36	13.4	0.626	0.230	1.71
Mg	cmol+/kg	2.35	0.150	6.4	36	2.34	0.085	0.031	1.33
Mn	cmol+/kg	0.016	0.003	16.1	12	0.016	0.002	0.001	5.82

Method: Mehlich-3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	1.55	0.275	17.8	63	1.53	0.140	0.043	2.80
Ca	mg/kg	5290	445	8.4	92	5330	247	58.0	1.10
Cu	mg/kg	9.31	0.934	10.0	103	9.28	0.530	0.115	1.24
Fe	mg/kg	414	53.4	12.9	101	409	29.1	6.65	1.61
K	mg/kg	626	31.8	5.1	96	625	19.7	4.06	0.649
Mg	mg/kg	346	25.3	7.3	91	347	16.0	3.31	0.958
Mn	mg/kg	197	22.4	11.4	104	196	14.3	2.75	1.39
Na	mg/kg	32.7	4.38	13.4	65	32.9	2.53	0.679	2.08
P	mg/kg	523	56.2	10.7	119	523	32.0	6.44	1.23
Zn	mg/kg	34.5	4.11	11.9	103	34.0	2.60	0.506	1.47
Al	mg/kg	389	44.8	11.5	52	382	29.3	7.76	2.00

Method: Extraction with 0.01M CaCl2 - 0.005M DTPA 1:10 (w/v)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	mg/kg	6.93	1.12	16.2	84	6.98	0.675	0.153	2.20
Fe	mg/kg	57.1	19.6	34.4	88	57.7	12.6	2.62	4.59
Mn	mg/kg	38.8	8.60	22.1	90	38.9	5.00	1.13	2.92
Zn	mg/kg	12.6	2.04	16.1	89	12.6	1.29	0.270	2.14

Method: Extraction with 1M KCl 1:10 (w/v)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
N - NH4 (as N)	mg/kg	13.3	2.20	16.5	51	13.5	1.52	0.384	2.89
N - NO3 (as N)	mg/kg	17.3	2.75	15.9	64	17.4	1.70	0.429	2.48

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - Olsen (as P)	mg/kg	174	36.0	20.7	178	175	23.0	3.38	1.94
Al - Ox	mg/kg	774	95.0	12.3	15	782	52.3	30.7	3.96



Consensus Values ISE 848

Method: Phosphorus and related analysis									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Fe - Ox	mg/kg	2879	455	15.8	15	2997	235	147	5.10
P - Ox	mg/kg	1389	84.6	6.1	15	1393	50.0	27.3	1.97
P - AL (as P)	mg/kg	1289	113	8.8	53	1271	62.1	19.4	1.50

Method: UK Soil Methods

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P – NaHCO ₃ (1/20)	mg/l	172	23.0	13.3	58	172	14.9	3.77	2.19
K - NH ₄ NO ₃ (1/5)	mg/l	632	59.1	9.3	67	637	45.0	9.02	1.43
Mg - NH ₄ NO ₃ (1/5)	mg/l	265	31.6	11.9	67	267	21.1	4.82	1.82
pH - H ₂ O (2/5)	...	7.67	0.123	1.6	63	7.68	0.070	0.019	0.253

Method: Extraction with dilute nitric acid (0.43 Mol/l) ISO 17586

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Zn	mg/kg	64.8	5.33	8.2	8	64.5	3.41	2.36	3.63
K	mg/kg	731	99.8	13.7	8	742	76.1	44.1	6.03
Mg	mg/kg	1131	111	9.8	8	1122	91.3	49.2	4.35
Mn	mg/kg	533	73.0	13.7	8	536	58.6	32.3	6.05
Na	mg/kg	61.1	3.82	6.3	8	61.5	2.10	1.69	2.76



Indicative Values ISE 848



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
F	mg/kg	1509	61.1	4.0	5	1490	41.0	34.1	2.26
I	mg/kg	3.81	0.766	20.1	7	3.80	0.370	0.362	9.49
Li	mg/kg	40.3	9.43	23.4	6	41.6	4.30	4.81	11.9
Se	mg/kg	0.959	0.522	54.4	9	1.00	0.200	0.217	22.7
Ag	mg/kg	0.733	0.995	135.7	8	1.02	0.612	0.440	60.0
Bi	mg/kg	0.486	0.306	62.9	6	2.75	0.200	0.156	32.1
Cs	mg/kg	5.94	1.45	24.4	18	6.23	0.710	0.427	7.18
Ge	mg/kg	0.323	0.110	34.1	6	0.350	0.050	0.056	17.4
W	mg/kg	1.86	0.721	38.7	13	1.90	0.390	0.250	13.4

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	18.7	10.8	57.7	33	20.1	6.59	2.35	12.6
Rb	mg/kg	54.9	1.38	2.5	4	54.5	0.735	0.860	1.57
Se	mg/kg	0.455	0.315	69.1	24	0.615	0.353	0.080	17.6
Sn	mg/kg	1.73	0.761	44.1	48	1.80	0.397	0.137	7.95
Y	mg/kg	11.7	1.72	14.7	8	12.3	0.975	0.761	6.48
Zr	mg/kg	7.00	4.01	57.2	5	8.21	2.65	2.24	32.0
Sb	mg/kg	0.542	0.168	30.9	27	0.584	0.067	0.040	7.44
Tl	mg/kg	0.284	0.073	25.8	14	0.301	0.040	0.025	8.62
Ti	mg/kg	245	122	49.8	24	248	90.0	31.1	12.7
Ce	mg/kg	39.4	4.86	12.3	4	39.6	2.53	3.04	7.72
U	mg/kg	0.821	0.038	4.6	7	0.820	0.022	0.018	2.18

Method: Aqua Regia (ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	18.5	6.45	34.8	45	18.2	3.29	1.20	6.48
La	mg/kg	18.1	2.54	14.0	6	18.4	1.27	1.29	7.16
Rb	mg/kg	38.7	2.08	5.4	4	38.2	1.11	1.30	3.36
Sc	mg/kg	3.66	0.442	12.1	4	3.71	0.200	0.276	7.54
Se	mg/kg	0.213	0.058	27.3	28	0.231	0.031	0.014	6.44
Th	mg/kg	4.11	1.33	32.3	6	4.06	0.735	0.678	16.5
Y	mg/kg	11.6	1.32	11.4	5	11.4	0.780	0.739	6.36



Indicative Values ISE 848

Method: Extraction with 0.01M CaCl₂ 1:10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Co	µg/kg	5.29	1.88	35.5	12	5.71	0.926	0.677	12.8
Fe	mg/kg	1.77	2.33	131.9	16	2.51	1.94	0.729	41.2
Zn	µg/kg	135	52.8	39.2	11	143	59.4	19.9	14.8
Ni	µg/kg	25.4	7.95	31.3	5	25.0	0	4.44	17.5

Method: Soil characteristics

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Active Lime (as CaCO ₃)	%	1.66	1.47	88.3	16	2.21	1.05	0.458	27.6

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B - Hot water	mg/kg	1.01	0.436	43.0	55	1.00	0.300	0.073	7.25

Method: Pot. CEC using 1M NH₄-acetate at pH=7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	cmol+/kg	0.029	0.016	56.3	7	0.030	0.010	0.008	26.6

Method: Pot. CEC using 1M or 0.1M BaCl₂-TEA at pH=8.1 (ISO 13536 OR BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Na	cmol+/kg	0.175	0.070	40.1	5	0.177	0.041	0.039	22.4
K	cmol+/kg	1.82	0.224	12.3	6	1.84	0.144	0.114	6.28
Mg	cmol+/kg	2.25	0.236	10.5	6	2.33	0.123	0.120	5.35
Ca	cmol+/kg	14.2	2.25	15.8	6	15.0	1.00	1.15	8.07

Method: Pot. CEC using 1M NH₄Cl (BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Na	cmol+/kg	0.154	0.034	22.1	13	0.150	0.027	0.012	7.67
Mn	cmol+/kg	0.044	0.006	14.7	8	0.046	0.005	0.003	6.49

Method: Act. CEC using 0.01M BaCl₂ (ISO 11260)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	20.1	0.349	1.7	5	20.1	0.220	0.195	0.970
Na	cmol+/kg	0.124	0.011	9.0	6	0.128	0.009	0.006	4.57
K	cmol+/kg	2.17	0.066	3.0	6	2.15	0.035	0.033	1.54
Mg	cmol+/kg	2.59	0.239	9.2	6	2.60	0.129	0.122	4.71
Ca	cmol+/kg	17.8	0.361	2.0	6	17.7	0.165	0.184	1.04



Indicative Values ISE 848

Method: Act. CEC using 0.1M BaCl₂ (UNEP-UN/EC 91065A)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Na	cmol+/kg	0.122	0.010	8.1	5	0.120	0.005	0.006	4.54
K	cmol+/kg	1.51	0.137	9.1	5	1.49	0.086	0.077	5.08
Ca	cmol+/kg	14.4	0.629	4.4	5	14.5	0.455	0.352	2.44
Mg	cmol+/kg	2.43	0.113	4.6	5	2.45	0.057	0.063	2.59
Mn	cmol+/kg	0.038	0.003	9.2	5	0.037	0.002	0.002	5.13

Method: Water soluble 1:10 (w/v) (EN-12457-4)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cl	mg/kg	23.0	14.0	60.8	6	24.0	11.5	7.15	31.0
N - NO ₃ (as N)	mg/kg	17.1	3.01	17.6	7	16.0	2.00	1.42	8.34

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - Bray (as P)	mg/kg	268	173	64.6	116	287	104	20.1	7.50
P - w (as P)	mg/l soil	66.7	16.7	25.0	17	65.4	9.28	5.06	7.59

Method: Water soluble 1:10 (w/v) (Neth standard VPR C85-06)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
SO ₄	mg/kg	57.3	12.9	22.5	13	55.0	12.1	4.46	7.80

Method: Extraction with dilute nitric acid (0.43 Mol/l) ISO 17586

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cr	mg/kg	3.10	0.374	12.1	4	3.11	0.232	0.234	7.54
Cu	mg/kg	18.4	3.81	20.7	8	18.1	2.36	1.69	9.15
Ni	mg/kg	6.97	0.056	0.8	4	6.99	0.030	0.035	0.505
Al	g/kg	1.42	0.114	8.0	4	1.42	0.055	0.071	5.00
Fe	g/kg	2.04	0.456	22.3	8	2.10	0.289	0.201	9.87
P	mg/kg	2002	123	6.1	7	1996	74.5	58.0	2.90
S	mg/kg	55.5	13.4	24.0	7	53.1	7.40	6.31	11.4
Ca	g/kg	13.8	1.57	11.4	7	14.8	1.92	0.742	5.38