

ANNEX 2 RESULTS

Aqua regia digestion

A.2.1 Thermal heating digestion with Aqua regia:

The results in the tables above result from digestions performed at NUA according method B of Horizontal draft standard – series 100

And from digestions performed in Kassel with standing over night – series 200

Analysis was performed at NUA with the same equipment and staff, but on different days

Results in the first 4 lines of the following tables are obtained by AAS, starting with Al the results of analysis with ICP are listed.

For more details see Annex 1

Table A.2.1. 1 Results of thermal heating digestion of compost sample CW1

	UB0109F	UB0109G	UB0109H	UB0109I	UB0109J	UB0225F-(RF4	UB0225G-(RF5	UB0225H-(RF6	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in mg/kg	18,93	17,87	18,27	18,27	18,53				18,37	0,39	2,14
Mercury as Hg in mg/kg	7,66	7,60	7,68	7,68	7,95				7,71	0,13	1,74
Cadmium as Cd in mg/kg	5,08	5,11	4,98	5,14	5,13				5,09	0,06	1,26
Cobalt as Co in mg/kg	14,13	14,33	13,67	12,47	13,13				13,55	0,76	5,62
Aluminium as Al in mg/kg	13453,33	13420,00	13693,33	13333,33	13400,00	15393,33	14966,67	14600,00	14032,50	824,72	5,88
Calcium as Ca in mg/kg	81313,33	80773,33	80664,67	82646,67	82026,67	83226,67	83060,00	83646,67	82169,75	1151,86	1,40
Cadmium as Cd in mg/kg	6,11	6,09	5,85	6,02	6,04	5,83	6,12	6,03	6,01	0,11	1,85
Chromium as Cr in mg/kg	194,07	193,33	195,33	199,77	194,67	201,07	205,33	205,47	198,63	4,99	2,51
Copper as Cu in mg/kg	644,00	709,33	720,00	706,67	622,00	592,67	581,73	706,67	660,38	57,01	8,63
Iron as Fe in mg/kg	19610,40	19813,33	20173,00	19600,00	19556,00	19605,33	19186,67	20046,67	19698,93	308,91	1,57
Potassium as K in mg/kg	7773,33	7786,67	7686,67	7900,00	7860,00	8513,33	8480,00	8293,33	8036,67	336,76	4,19
Magnesium as Mg in mg/kg	13073,33	13166,67	13153,33	13386,67	13233,33	13720,00	13333,33	13660,00	13340,83	237,97	1,78
Manganese as Mn in mg/kg	759,71	769,67	800,00	782,67	769,07	783,93	773,33	780,00	777,30	12,23	1,57
Sodium as Na in mg/kg	4665,33	4642,00	4590,67	4617,33	4672,00	4251,33	4208,00	4256,67	4487,92	208,47	4,65
Nickel as Ni in mg/kg	238,67	246,67	244,00	250,00	248,00	253,33	252,67	240,67	246,75	5,35	2,17
Lead as Pb in mg/kg	1653,33	1626,67	1673,33	1680,00	1660,00	1720,00	1746,67	1746,67	1688,33	44,61	2,64
Sulphur as SO4 in mg/kg	25600,00	25753,33	25286,67	25840,00	25466,67	26726,67	27253,33	27053,33	26122,50	767,94	2,94
Zink as Zn in mg/kg	1838,00	2028,67	2033,33	1940,00	1793,33	1573,33	1413,07	1720,00	1792,47	218,72	12,20
Phosphor as P2O5 in mg/kg	8200,00	8393,33	7580,00	7854,67	7780,00	7980,00	8693,33	8206,67	8086,00	359,62	4,45

Table A.2.1. 2 Thermal Heating CW5

	UB0110D	UB0110E	UB0110F	arithmetic mean	coefficient of variation
Arsenic as As in mg/kg	4,67	4,67	4,60	4,64	0,83
Mercury as Hg in mg/kg	0,28	0,27	0,25	0,27	5,73
Cadmium as Cd in mg/kg	0,61	0,63	0,63	0,62	2,00
Cobalt as Co in mg/kg	8,27	8,20	8,13	8,20	0,81
Aluminium as Al in mg/kg	12400,00	12282,67	12666,67	12449,78	1,58
Calcium as Ca in mg/kg	37586,67	37813,33	37166,67	37522,22	0,87
Chromium as Cr in mg/kg	292,67	291,33	289,33	291,11	0,58
Copper as Cu in mg/kg	70,00	69,33	69,33	69,56	0,55
Iron as Fe in mg/kg	18266,67	18066,67	18600,00	18311,11	1,47
Potassium as K in mg/kg	11860,00	11866,67	11660,00	11795,56	1,00
Magnesium as Mg in mg/kg	8733,27	8653,33	8566,67	8651,09	0,96
Manganese as Mn in mg/kg	942,00	946,67	931,33	940,00	0,84
Sodium as Na in mg/kg	3526,67	3553,33	3506,67	3528,89	0,66
Nickel as Ni in mg/kg	247,33	246,67	244,67	246,22	0,56
Lead as Pb in mg/kg	101,47	104,00	92,00	99,16	6,38
Sulphur as SO4 in mg/kg	13016,67	12866,67	12866,67	12916,67	0,67
Zink as Zn in mg/kg	312,67	300,00	296,67	303,11	2,78
Phosphor as P2O5 in mg/kg	9320,00	9213,33	9086,67	9206,67	1,27

Table A.2.1. 3 Results of thermal heating digestion of sludge sample SL4

	UB0111D	UB0111E	UB0111F	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in	5,83	5,90	5,90	5,88	0,04	0,65
Cadmium as Cd	3,37	3,31	3,23	3,30	0,07	2,23
Cobalt as Co in	6,87	6,87	7,03	6,92	0,10	1,39
Silver as Ag in	17,00	16,53	16,47	16,67	0,29	1,74
Aluminium as A	9060,00	8666,67	9485,33	9070,67	409,44	4,51
Bor as B in mg/	37,07		33,53	35,30	2,50	7,08
Barium as Ba in	542,67	510,67	502,00	518,44	21,42	4,13
Beryllium as Be	3,00	2,97	3,07	3,01	0,05	1,69
Calcium as Ca i	37066,67	36460,00	36666,67	36731,11	308,42	0,84
Cadmium as Cd	3,89	3,95	3,87	3,90	0,04	1,07
Cobalt as Co in	12,87	12,93	12,73	12,84	0,10	0,79
Chromium as C	464,00	454,20	492,00	470,07	19,62	4,17
Copper as Cu in	700,00	760,00	706,67	722,22	32,89	4,55
Iron as Fe in mg	75866,67	60200,00	70000,00	68688,89	7915,20	11,52
Potassium as K	1188,67	1150,67	1127,33	1155,56	30,96	2,68
Lithium as Li in	6,00	5,82	5,76	5,86	0,13	2,13
Magnesium as N	4684,00	4580,00	4566,67	4610,22	64,24	1,39
Manganese as M	423,33	414,00	412,00	416,44	6,05	1,45
Sodium as Na in	1300,00	1287,33	1253,33	1280,22	24,13	1,89
Nickel as Ni in	873,33	900,00	946,67	906,67	37,12	4,09
Lead as Pb in m	466,67	499,33	471,67	479,22	17,60	3,67
Sulphur as SO4	14280,00	13740,00	13926,67	13982,22	274,25	1,96
Strontium as Sr	87,33	86,00	86,00	86,44	0,77	0,89
Zink as Zn in m	3373,33	3393,33	3453,33	3406,67	41,63	1,22
Phosphor as P2	49066,67	46466,67	50533,33	48688,89	2059,49	4,23

Table A.2.1. 4 Thermal Heating SO4

	UB0114F	UB0114G	UB0114H	UB0114I	UB0114J	UB0223F-(RF10)	UB0223G-(RF11)	UB0223H-(RF12)	arithmetic mean	standard deviation	of variation
Arsenic as As in mg/kg	31,73	30,67	30,67	29,87	29,33				30,45	0,91	3,00
Mercury as Hg in mg/kg	0,20	0,20	0,21	0,20	0,16				0,19	0,02	11,03
Cadmium as Cd in mg/kg	0,23	0,23	0,22	0,23	0,23				0,23	0,01	2,97
Cobalt as Co in mg/kg	3,93	3,97	3,93	4,03	4,13				4,00	0,08	2,12
Aluminium as Al in mg/kg	12832,67	10886,67	10992,00	11578,00	10624,00	12400,00	12500,00	12049,33	11732,83	833,39	7,10
Calcium as Ca in mg/kg	4987,33	4776,67	4766,00	4737,33	4776,67	4652,00	4958,00	4757,33	4801,42	113,35	2,36
Cadmium as Cd in mg/kg						1,03	1,09	1,06	1,06	0,03	2,69
Chromium as Cr in mg/kg	27,60	26,80	26,83	26,87	26,40	23,85	25,30	24,60	26,03	1,30	5,00
Copper as Cu in mg/kg	13,20	13,40	13,33	13,33	13,53	17,77	21,53	18,63	15,59	3,26	20,89
Iron as Fe in mg/kg	15400,00	13706,67	13798,67	14533,33	13233,33	15433,33	15566,67	14800,00	14559,00	895,05	6,15
Potassium as K in mg/kg	1963,33	1782,00	1767,33	1753,33	1763,33	1741,67	1797,33	1787,33	1794,46	70,63	3,94
Magnesium as Mg in mg/kg	1868,00	1718,00	1684,67	1700,00	1701,33	1756,33	1886,33	1789,33	1763,00	78,29	4,44
Manganese as Mn in mg/kg	308,67	286,00	288,00	282,67	290,67	293,33	311,00	296,00	294,54	10,32	3,50
Sodium as Na in mg/kg	272,00	258,00	256,00	261,33	260,67	113,33	138,00	112,67	209,00	73,15	35,00
Nickel as Ni in mg/kg	15,27	14,40	14,33	14,47	14,33	14,60	15,43	14,63	14,68	0,43	2,92
Lead as Pb in mg/kg	33,33	36,40	38,93	36,13	39,53	35,33	46,00	45,67	38,92	4,69	12,06
Sulphur as SO4 in mg/kg	2706,67	2559,33	2536,67	2559,33	2446,00	2517,33	2700,67	2586,67	2576,58	88,78	3,45
Zink as Zn in mg/kg	58,07	61,93	57,20	59,07	55,73	35,33	39,67	36,33	50,42	11,22	22,26
Phosphor as P2O5 in mg/kg	1358,00	1449,33	1426,00	1447,33	1460,67	1320,00	1560,00	1476,67	1437,25	73,26	5,10

Table A.2.1. 5 Thermal Heating SO 13

	UB0117F	UB0117G	UB0117H	UB0117I	UB0117J	UB0226F-(RF13)	UB0226G-(RF14)	UB0226H-(RF15)	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in mg/kg	12,40	12,73	13,33	13,33	12,40				12,84	0,47	3,66
Mercury as Hg in mg/kg	0,47	0,42	0,45	0,47	0,42				0,45	0,02	5,39
Cadmium as Cd in mg/kg	1,03	0,93	0,91	0,92	0,85				0,93	0,07	7,28
Cobalt as Co in mg/kg	7,50	7,43	7,17	7,47	7,10				7,33	0,19	2,53
Aluminium as Al in mg/kg	15866,67	16200,00	16020,00	15506,67	15532,00	15000,00	14932,67	15306,67	15545,58	461,14	2,97
Bor as B in mg/kg	12,67	12,18	12,13	11,73	12,06	29,00	28,13	28,93	18,35	8,57	46,67
Barium as Ba in mg/lkg	178,00	170,67	174,67	172,00	167,91	186,00	164,33	187,00	175,07	8,16	4,66
Beryllium as Be in mg/l	2,33	2,31	2,27	2,26	2,29	1,52	1,43	1,59	2,00	0,41	20,31
Calcium as Ca in mg/kg	22320,00	23033,33	21726,67	22446,67	24000,00	25223,33	23010,00	27873,33	23704,17	2004,17	8,45
Cadmium as Cd in mg/kg	1,05	0,91	0,99	1,03	1,00	1,34	1,24	1,46	1,13	0,19	17,19
Cobalt as Co in mg/kg	10,33	10,60	10,33	10,67	10,27	7,80	6,47	7,47	9,24	1,70	18,40
Chromium as Cr in mg/kg	33,33	33,67	34,53	33,87	33,67	33,33	30,80	33,27	33,31	1,09	3,29
Copper as Cu in mg/kg	252,00	240,67	246,00	246,00	240,00	251,00	217,23	209,67	237,82	15,76	6,63
Iron as Fe in mg/kg	26226,67	26800,00	26326,67	25253,33	26333,33	37223,33	35093,33	30266,67	29190,42	4580,91	15,69
Potassium as K in mg/kg	3916,00	3997,33	3930,00	3936,00	3900,00	3656,67	3350,00	3693,33	3797,42	217,83	5,74
Lithium as Li in mg/kg	17,40	17,67	17,27	17,33	17,13	19,07	18,33	20,13	18,04	1,07	5,92
Magnesium as Mg in mg/kg	5950,67	6032,67	5860,00	5960,67	5907,33	6150,00	5736,67	6250,00	5981,00	162,43	2,72
Manganese as Mn in mg/kg	284,67	282,67	279,33	278,67	283,33	306,33	288,00	319,67	290,33	14,73	5,07
Sodium as Na in mg/kg	1760,67	1776,67	1702,00	1706,67	1730,00	1194,67	1087,67	1282,67	1530,13	288,87	18,88
Nickel as Ni in mg/kg	29,87	29,87	29,13	30,07	28,33	27,10	23,27	28,20	28,23	2,25	7,97
Lead as Pb in mg/kg	131,33	102,00	99,33	114,87	102,00	261,90	105,80	130,17	130,93	54,40	41,55
Sulphur as SO4 in mg/kg	5728,67	5658,00	5649,33	5636,67	5514,87	5558,33	5106,67	5833,33	5585,73	216,75	3,88
Zink as Zn in mg/kg	457,07	444,67	434,00	450,60	433,33	430,00	386,67	406,67	430,38	23,36	5,43
Phosphor as P2O5 in mg/kg	16420,00	16386,67	16006,67	16186,67	16380,00	16750,00	17033,33	19833,33	16874,58	1236,98	7,33

Table A.2.1. 6 Thermal Heating SO16R

	UB0118 F	UB0118 G	UB0118H	UB0118 I	UB0118 J	UB0224- (RF1)	UB0224- (RF2)	UB0224- (RF3)	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in mg/kg	8,73	8,87	8,87	8,87	8,87				8,84	0,06	0,67
Mercury as Hg in mg/kg	0,11	0,11	0,10	0,11	0,11				0,11	0,00	3,98
Cadmium as Cd in mg/kg	0,44	0,45	0,45	0,45	0,45				0,45	0,00	0,84
Cobalt as Co in mg/kg	7,87	7,67	7,70	7,53	6,97				7,55	0,35	4,58
Aluminium as Al in mg/kg	#####	11720,00	12639,93	#####	#####	14030,00	13956,67	13800,00	12993,83	895,33	6,89
Calcium as Ca in mg/kg	1458,00	1448,00	1432,00	1448,67	1444,00	1528,00	1505,67	1566,33	1478,83	48,54	3,28
Cadmium as Cd in mg/kg						0,68	0,75	0,71	0,71	0,04	4,90
Chromium as Cr in mg/kg	22,40	22,53	22,27	22,00	22,20	21,96	21,90	21,63	22,11	0,29	1,33
Copper as Cu in mg/kg	16,00	16,40	16,40	16,47	16,20	18,07	18,77	18,52	17,10	1,14	6,68
Iron as Fe in mg/kg	#####	22346,67	24200,00	#####	#####	25210,00	24740,00	23763,33	24232,50	1361,60	5,62
Potassium as K in mg/kg	2277,33	2264,00	2280,67	2246,00	2314,00	2431,33	2314,67	2401,00	2316,13	66,42	2,87
Magnesium as Mg in mg/kg	2922,67	2993,33	3032,67	2996,00	3032,00	3271,33	3272,00	3355,98	3109,50	163,25	5,25
Manganese as Mn in mg/kg	1018,00	1000,53	1036,33	1060,00	1004,67	1054,20	1110,00	1110,50	1049,28	43,24	4,12
Nickel as Ni in mg/kg	18,40	18,80	19,27	18,47	18,67	18,30	20,30	17,47	18,71	0,82	4,39
Lead as Pb in mg/kg	61,73	60,38	64,00	59,47	60,13	68,67	71,00	72,33	64,71	5,21	8,05
Sulphur as SO4 in mg/kg	1464,67	1400,67	1422,67	1428,00	1431,33	1634,33	1640,33	1644,33	1508,29	110,21	7,31
Zink as Zn in mg/kg	119,33	118,67	122,67	116,67	112,67	112,67	118,00	128,00	118,58	5,07	4,28
Phosphor as P2O5 in mg/kg	2353,33	2353,33	2317,33	2160,00	2153,33	2450,00	2596,67	2696,67	2385,08	191,63	8,03

A.2.2. Closed Microwave digestion with Aqua regia:

The results in the tables above result from digestions performed at NUA according method B of Horizontal draft standard – series 100

And from digestions performed in Kassel with variation of performance characteristics – series 200

Analysis was performed at NUA with the same equipment and staff, but on different days Results in the first 4 lines of the following tables are obtained by AAS, starting with Al the results of ICP-analysis are listed.

For more details see Annex 1

Table A.2.2.1 Results of closed microwave digestion of compost sample CW1

	UB0109A	UB0109B	UB0109C	UB0109D	UB0109E	UB0225A	UB0225B	UB0225C	arithmetic	standard	coefficient
Arsenic as As in mg/kg	17,24	18,29	18,29	17,75	16,71				17,65	0,68	3,87
Mercury as Hg in mg/kg	7,00	7,71	7,72	7,18	7,77				7,48	0,36	4,77
Cadmium as Cd in mg/kg	5,22	5,15	5,24	5,02	4,72				5,07	0,22	4,28
Cobalt as Co in mg/kg	12,65	12,16	12,16	11,45	13,36				12,36	0,70	5,70
Aluminium as Al in mg/kg	12066,56	12691,92	11642,07	11354,58	10586,24	18063,58	13740,46	17651,19	13474,58	2862,66	21,24
Calcium as Ca in mg/kg	81347,15	80977,07	79930,21	79541,83	79680,96	80065,03	73727,74	77320,95	79073,87	2471,18	3,13
Cadmium as Cd in mg/kg	5,81	5,35	5,28	5,32	5,58	6,92	5,97	5,41	5,71	0,55	9,65
Chromium as Cr in mg/kg	194,60	197,68	196,91	193,23	178,46	218,71	139,95	204,91	190,56	23,36	12,26
Copper as Cu in mg/kg	632,72	605,05	582,92	619,02	619,14	518,79	636,13	631,70	605,69	39,21	6,47
Iron as Fe in mg/kg	18533,28	20049,50	19142,57	18256,97	17806,58	19718,21	11685,75	18711,54	17988,05	2651,71	14,74
Potassium as K in mg/kg	8744,52	8377,47	8470,59	8330,68	8781,66	8726,88	7188,30	8408,49	8378,57	513,55	6,13
Magnesium as Mg in mg/kg	13132,72	12253,24	12153,54	12201,20	12492,52	13273,12	12334,61	12698,94	12567,49	430,75	3,43
Manganese as Mn in mg/kg	790,16	753,74	745,36	754,98	741,08	765,17	724,87	742,71	752,26	19,37	2,57
Sodium as Na in mg/kg	4214,83	4097,71	4169,49	4059,76	4205,38	5132,95	4136,13	4115,38	4266,45	354,08	8,30
Nickel as Ni in mg/kg	249,10	232,30	231,31	228,09	234,30	236,99	218,83	224,14	231,88	9,05	3,90
Lead as Pb in mg/kg	1574,33	1683,95	1535,39	1623,51	1694,92	2046,97	839,69	1465,52	1558,03	338,75	21,74
Sulphur as SO4 in mg/kg	26544,44	26969,09	26440,68	26245,02	25034,90	22716,76	21393,13	24515,92	24982,49	2012,25	8,05
Zink as Zn in mg/kg	1833,40	1708,57	1874,38	1952,19	1534,40	2398,84	2321,88	2393,90	2002,20	330,66	16,51
Phosphor as P2O5 in mg/kg	7951,38	8474,58	8335,00	8187,25	8285,14	7731,21	3157,12	7228,12	7418,72	1767,75	23,83

Table A.2.2. 2 Closed Vessel CW5

	UB0110A	UB0110B	UB0110C	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in mg/kg	4,80	4,92	5,04	4,92	0,12	2,36
Mercury as Hg in mg/kg	0,24	0,25	0,23	0,24	0,01	3,64
Cadmium as Cd in mg/kg	0,63	0,66	0,63	0,64	0,02	2,74
Cobalt as Co in mg/kg	7,66	7,80	8,13	7,86	0,24	3,07
Aluminium as Al in mg/kg	9719,72	9960,00	10007,98	9895,90	154,45	1,56
Calcium as Ca in mg/kg	36926,93	36970,00	36844,21	36913,71	63,93	0,17
Chromium as Cr in mg/kg	284,28	288,00	285,26	285,85	1,93	0,67
Copper as Cu in mg/kg	68,47	75,90	70,22	71,53	3,89	5,43
Iron as Fe in mg/kg	18388,39	18600,00	18868,94	18619,11	240,85	1,29
Potassium as K in mg/kg	10660,66	10650,00	10522,64	10611,10	76,79	0,72
Magnesium as Mg in mg/kg	8777,78	8753,00	8815,08	8781,95	31,25	0,36
Manganese as Mn in mg/kg	936,94	941,00	930,58	936,17	5,25	0,56
Sodium as Na in mg/kg	3331,33	3330,00	3321,36	3327,57	5,41	0,16
Nickel as Ni in mg/kg	236,24	241,00	237,38	238,21	2,49	1,04
Lead as Pb in mg/kg	99,96	97,00	99,64	98,87	1,62	1,64
Sulphur as SO4 in mg/kg	12612,61	12566,00	12719,93	12632,85	78,93	0,62
Zink as Zn in mg/kg	279,28	282,00	280,27	280,52	1,38	0,49
Phosphor as P2O5 in mg/kg	9359,36	8900,00	9086,38	9115,24	231,04	2,53

Table A.2.2. 3 Closed Vessel SL4

	UB0111A	UB0111B	UB0111C	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in mg/kg	6,29	5,94	5,75	5,99	0,27	4,56
Mercury as Hg in mg/kg	1,51	1,64	1,57	1,57	0,06	4,04
Cadmium as Cd in mg/kg	3,25	3,25	3,21	3,24	0,03	0,79
Cobalt as Co in mg/kg	8,03	7,69	6,70	7,47	0,69	9,27
Silver as Ag in mg/l	15,77	16,67	16,20	16,21	0,45	2,78
Aluminium as Al in mg/kg	8243,51	8394,89	9088,18	8575,53	450,38	5,25
Bor as B in mg/kg	28,64	29,55	28,79	28,99	0,48	1,67
Barium as Ba in mg/lkg	479,04	439,21	509,90	476,05	35,44	7,44
Beryllium as Be in mg/l	2,99	3,09	2,97	3,02	0,07	2,19
Calcium as Ca in mg/kg	36267,47	35486,12	36752,65	36168,75	639,01	1,77
Cadmium as Cd in mg/kg	3,71	3,91	4,10	3,91	0,19	4,95
Cobalt as Co in mg/kg	13,00	13,68	13,30	13,33	0,34	2,53
Chromium as Cr in mg/kg	445,11	437,21	453,91	445,41	8,35	1,88
Copper as Cu in mg/kg	656,69	639,85	612,88	636,47	22,10	3,47
Iron as Fe in mg/kg	45708,58	46116,99	48090,38	46638,65	1273,71	2,73
Potassium as K in mg/kg	902,20	930,33	972,81	935,11	35,55	3,80
Lithium as Li in mg/kg	5,29	5,34	5,60	5,41	0,17	3,07
Magnesium as Mg in mg/kg	4455,09	4605,71	4527,09	4529,30	75,33	1,66
Manganese as Mn in mg/kg	418,16	396,29	414,92	409,79	11,81	2,88
Sodium as Na in mg/kg	1233,53	1266,72	1227,75	1242,67	21,03	1,69
Nickel as Ni in mg/kg	861,28	826,51	926,81	871,53	50,93	5,84
Lead as Pb in mg/kg	475,05	469,16	484,90	476,37	7,96	1,67
Sulphur as SO4 in mg/kg	15027,94	15836,49	15650,87	15505,10	423,53	2,73
Strontium as Sr in mg/kg	101,34	104,01	103,78	103,04	1,48	1,44
Zink as Zn in mg/kg	2905,99	2844,88	3109,38	2953,42	138,48	4,69
Phosphor as P2O5 in mg/kg	44510,98	43905,97	49286,14	45901,03	2947,16	6,42

Table A.2.2. 4 Closed Vessel SL11

	UB0112A	UB0112B	UB0112C	arithmetic mean	standard deviation	coefficient of variation
Aluminium as Al in mg/kg	77682,49	83333,33	80709,45	80575,09	2827,82	3,51
Calcium as Ca in mg/kg	54836,46	55585,42	55430,45	55284,11	395,35	0,72
Chromium as Cr in mg/kg	75,79	77,16	74,43	75,79	1,36	1,80
Copper as Cu in mg/kg	144595,13	129430,51	119569,55	131198,40	12606,11	9,61
Iron as Fe in mg/kg	4676,90	4579,85	4495,82	4584,19	90,62	1,98
Potassium as K in mg/kg	870,56	861,21	846,95	859,57	11,89	1,38
Magnesium as Mg in mg/kg	2428,20	2435,28	2411,32	2424,94	12,31	0,51
Manganese as Mn in mg/kg	603,31	606,33	605,82	605,15	1,62	0,27
Sodium as Na in mg/kg	10869,57	10852,25	11697,89	11139,90	483,31	4,34
Nickel as Ni in mg/kg	1775,03	1851,85	1783,58	1803,49	42,10	2,33
Lead as Pb in mg/kg	10570,40	15929,91	15344,76	13948,36	2939,99	21,08
Sulphur as SO ₄ in mg/kg	189150,38	197929,11	190314,87	192464,79	4767,93	2,48
Zink as Zn in mg/kg	1386,12	1483,47	1459,74	1443,11	50,76	3,52
Phosphor as P ₂ O ₅ in mg/kg	10999,20	11469,53	11717,82	11395,52	364,98	3,20

Table A.2.2. 5 Closed Vessel SO4

	UB0114 A	UB0114B	UB0114C	UB0114 D	UB0114E	UB0223 A-(MW7)	UB0223B (MW8)	UB0223C (MW9)	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in mg/kg	26,75	27,69	29,45	29,44	28,27				28,32	1,16	4,09
Mercury as Hg in mg/kg	0,22	0,33	0,26	0,21	0,23				0,25	0,05	19,05
Cadmium as Cd in mg/kg	0,24	0,24	0,24	0,24	0,25				0,24	0,01	3,08
Cobalt as Co in mg/kg	3,49	3,36	3,40	3,48	3,52				3,45	0,07	1,93
Aluminium as Al in mg/kg	8454,78	8607,29	9034,83	8094,67	9337,05	17718,44	16125,00	16875,00	11780,88	4281,39	36,34
Calcium as Ca in mg/kg	4355,16	4419,21	4506,47	4398,37	4469,44	5445,63	5109,38	5183,75	4735,92	435,33	9,19
Cadmium as Cd in mg/kg						1,23	1,00	1,03	1,09	0,12	11,23
Chromium as Cr in mg/kg	21,36	22,41	21,69	21,68	22,99	31,88	33,63	34,49	26,27	5,91	22,51
Copper as Cu in mg/kg	12,28	12,55	12,34	12,63	12,54	13,81	14,38	13,24	12,97	0,77	5,91
Iron as Fe in mg/kg	14938,11	14763,90	15058,41	14309,86	15518,61	16175,00	13767,50	15750,00	15035,17	780,16	5,19
Potassium as K in mg/kg	890,40	911,54	1029,85	854,22	979,49	290,63	3340,63	3242,50	1442,41	1164,18	80,71
Magnesium as Mg in mg/kg	1354,56	1367,80	1399,70	1320,60	1410,51	2137,50	2006,25	2049,38	1630,79	361,85	22,19
Manganese as Mn in mg/kg	287,48	288,68	287,06	285,40	295,64	309,38	264,38	328,13	293,27	18,78	6,40
Sodium as Na in mg/kg	200,64	200,14	203,98	198,89	207,05	125,63	121,25	103,75	170,16	44,63	26,23
Nickel as Ni in mg/kg	12,08	12,25	12,64	12,23	12,44	15,75	15,38	15,38	13,52	1,65	12,23
Lead as Pb in mg/kg	39,53	36,26	38,51	41,67	38,12	40,06	42,13	48,48	40,59	3,71	9,13
Sulphur as SO ₄ in mg/kg	2404,67	2448,69	2487,56	2449,28	2485,57	2751,88	2517,50	2651,88	2524,63	117,48	4,65
Zink as Zn in mg/kg	48,51	51,90	51,34	49,12	52,16	58,06	54,25	51,50	52,11	3,00	5,75
Phosphor as P ₂ O ₅ in mg/kg	1263,73	1356,84	1295,52	1344,47	1275,13	1370,63	1331,88	1572,50	1351,34	97,35	7,20

Table A.2.2. 6 Closed Vessel SO13

	UB0117A	UB0117B	UB0117C	UB0117D	UB0117E	A- (MW10)	UB0226B (MW11)	UB0226C (MW12)	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in mg/kg	12,56	12,76	12,61	12,56	10,89				12,28	0,78	6,34
Mercury as Hg in mg/kg	0,55	0,45	0,45	0,45	0,45				0,47	0,04	9,49
Cadmium as Cd in mg/kg	1,04	1,01	0,90	1,05	1,02				1,00	0,06	5,84
Cobalt as Co in mg/kg	7,58	7,63	7,35	7,48	6,79				7,37	0,34	4,57
Aluminium as Al in mg/kg	13022,54	11972,08	12110,44	12938,19	11707,63	26856,25	22043,75	24437,50	16886,05	6406,61	37,94
Bor as B in mg/kg	9,30	7,66	8,25	9,57	8,06	14,31	12,88	12,69	10,34	2,57	24,82
Barium as Ba in mg/lkg	159,55	161,39	145,86	179,46	181,85	308,75	228,13	252,50	202,19	56,24	27,82
Beryllium as Be in mg/l	2,05	2,27	2,08	2,21	1,74	1,79	1,64	1,74	1,94	0,24	12,41
Calcium as Ca in mg/kg	21011,17	28075,77	24859,94	24127,62	26229,02	22793,75	22131,25	26311,13	24442,46	2390,21	9,78
Cadmium as Cd in mg/kg	1,23	1,17		1,08	1,04	1,35	1,23	1,00	1,19	0,18	14,88
Cobalt as Co in mg/kg	10,56	10,35	10,13	10,18	9,31	6,75	6,69	5,88	8,73	1,95	22,34
Chromium as Cr in mg/kg	29,87	28,89	28,18	30,61	26,68	43,25	34,63	37,69	32,47	5,64	17,38
Copper as Cu in mg/kg	242,32	231,31	239,10	254,24	210,83	236,25	245,00	233,13	236,52	12,68	5,36
Iron as Fe in mg/kg	25408,86	27188,43	24649,86	26201,40	21498,80	28703,13	25687,50	30061,88	26174,98	2606,16	9,96
Potassium as K in mg/kg	3149,18	3039,88	3186,27	3256,23	2821,74	6831,25	5890,63	6158,13	4291,66	1682,55	39,21
Lithium as Li in mg/kg	13,46	13,76	13,21	14,16	12,19	23,81	21,19	22,00	16,72	4,74	28,32
Magnesium as Mg in mg/kg	5812,72	5801,60	5568,23	5959,12	5088,93	6230,63	6236,88	6285,00	5872,89	406,00	6,91
Manganese as Mn in mg/kg	285,20	311,07	278,11	294,12	264,79	316,88	286,88	287,50	290,57	16,89	5,81
Sodium as Na in mg/kg	1563,62	1478,56	1459,58	1671,98	1449,84	1064,38	1237,50	1084,38	1376,23	222,68	16,18
Nickel as Ni in mg/kg	27,02	26,12	26,21	27,22	23,38	27,25	26,56	27,50	26,41	1,32	5,01
Lead as Pb in mg/kg	109,99	94,22	92,94	90,93	92,43	111,88	113,13	101,88	100,92	9,51	9,42
Sulphur as SO4 in mg/kg	5586,96	5749,75	5234,09	5573,28	5593,53	4822,50	5471,25	4948,75	5372,51	335,61	6,25
Zink as Zn in mg/kg	432,09	400,70	391,83	450,65	401,68	441,25	393,75	383,13	411,88	25,53	6,20
Phosphor as P2O5 in mg/kg	18348,62	17866,40	15306,12	19212,36	15507,59	13656,25	20000,00	19250,00	17393,42	2285,53	13,14

Table A.2.2. 7 Closed Vessel SO16R

	UB0118 A	UB0118B	UB0118C	UB0118 D	UB0118E	UB0224- (MW1)	UB0224- (MW2)	UB0224- (MW19)	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in mg/kg	8,72	9,15	8,61	8,57	8,49				8,71	0,26	2,98
Mercury as Hg in mg/kg	0,11	0,16	0,15	0,13	0,14				0,14	0,02	14,66
Cadmium as Cd in mg/kg	0,52	0,45	0,48	0,46	0,47				0,48	0,03	5,43
Cobalt as Co in mg/kg	7,83	7,86	6,71	7,38	7,65				7,48	0,47	6,32
Aluminium as Al in mg/kg	11213,36	9876,67	9232,93	9768,74	10042,97	22405,06	23114,93	19441,03	14386,96	6131,74	42,62
Calcium as Ca in mg/kg	1390,83	1344,74	1542,16	1359,65	1388,17	1581,65	1508,89	1245,70	1420,22	113,71	8,01
Chromium as Cr in mg/kg	19,24	18,70	18,83	19,04	19,49	31,65	29,03	27,52	22,94	5,47	23,85
Copper as Cu in mg/kg	21,93	16,01	17,72	14,95	15,59	18,73	17,89	14,13	17,12	2,51	14,64
Iron as Fe in mg/kg	22861,42	22826,74	20458,64	23086,12	23785,73	24873,42	23055,09	19557,74	22563,11	1730,71	7,67
Potassium as K in mg/kg	1311,07	1174,66	1158,62	1265,95	1273,24	5732,28	5619,67	4818,80	2794,28	2166,67	77,54
Magnesium as Mg in mg/kg	2709,87	2361,25	2381,33	2547,85	2522,49	3953,16	3749,41	3023,96	2906,16	621,94	21,40
Manganese as Mn in mg/kg	1290,13	953,85	957,34	984,85	949,43	1050,00	995,26	800,92	997,72	137,85	13,82
Nickel as Ni in mg/kg	17,25	16,31	16,42	17,05	15,29	21,84	20,26	16,09	17,56	2,27	12,93
Lead as Pb in mg/kg	51,35	52,62	52,87	55,72	57,97	74,05	71,68	63,88	60,02	8,88	14,79
Sulphur as SO4 in mg/kg	1492,52	1406,41	1474,06	1379,59	1427,14	1780,38	1744,08	1328,62	1504,10	167,64	11,15
Zink as Zn in mg/kg	103,99	112,39	109,15	103,10	107,74	111,77	105,86	207,31	120,16	35,37	29,44
Phosphor as P2O5 in mg/kg	2545,36	2550,23	2660,73	2279,70	2368,58	2765,82	2766,59	1912,16	2481,15	288,01	11,61

A.2.3. Open Microwave digestion with Aqua regia:

The results above are all obtained by using method C of Horizontal draft standard
For details see Annex 1

Table A.2.3. 1 Results of open microwave digestion of compost sample CW1

	UB0109K	UB0109L	UB0109M	UB0109N	UB0109O	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in mg/kg	18,07	18,32	19,90	19,88	19,81	19,19	0,92	4,79
Mercury as Hg in mg/kg	7,20	6,52	6,41	6,87	6,43	6,68	0,34	5,12
Cadmium as Cd in mg/kg	4,86	4,99	4,86	4,80	5,17	4,94	0,15	3,04
Cobalt as Co in mg/kg	12,61	11,99	12,69	12,47	10,44	12,04	0,93	7,76
Aluminium as Al in mg/kg	10529,94	11096,68	11278,72	11459,79	11276,85	11128,40	358,33	3,22
Calcium as Ca in mg/kg	80614,66	81442,27	81538,46	81101,58	80916,87	81122,77	379,44	0,47
Chromium as Cr in mg/kg	181,25	183,78	182,82	179,60	180,36	181,56	1,72	0,95
Copper as Cu in mg/kg	685,58	651,22	592,41	624,63	614,16	633,60	35,94	5,67
Iron as Fe in mg/kg	18656,42	18755,49	18911,09	19092,00	18566,03	18796,21	209,09	1,11
Potassium as K in mg/kg	8061,47	7627,85	7778,22	7570,35	7647,18	7737,01	196,68	2,54
Magnesium as Mg in mg/kg	12559,10	13134,24	13126,87	13081,22	12983,29	12976,95	241,21	1,86
Manganese as Mn in mg/kg	759,46	789,05	784,22	784,27	778,64	779,13	11,60	1,49
Sodium as Na in mg/kg	4194,25	4155,01	4165,83	4170,82	4166,67	4170,52	14,49	0,35
Nickel as Ni in mg/kg	242,32	245,71	249,75	245,46	247,61	246,17	2,76	1,12
Lead as Pb in mg/kg	1628,05	1787,85	1748,25	1716,22	1630,87	1702,25	71,13	4,18
Sulphur as SO ₄ in mg/kg	25709,01	25878,95	26083,92	26025,74	25855,21	25910,57	148,33	0,57
Zink as Zn in mg/kg	1704,10	1767,88	1668,33	1706,25	1670,64	1703,44	40,21	2,36
Phosphor as P ₂ O ₅ in mg/kg	8382,58	7850,58	7772,23	7683,10	7766,51	7891,00	281,12	3,56

Table A.2.3. 2 Results of open microwave digestion SO₄

	UB0114K	UB0114L	UB0114M	UB0114N	UB0114O	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in mg/kg	28,30	29,48	27,73	27,31	27,55	28,07	0,87	3,09
Mercury as Hg in mg/kg	0,21	0,22	0,20	0,19	0,21	0,21	0,01	4,85
Cadmium as Cd in mg/kg	0,24	0,24	0,23	0,23	0,23	0,23	0,00	1,85
Cobalt as Co in mg/kg	3,23	3,24	3,06	3,10	3,23	3,17	0,08	2,62
Aluminium as Al in mg/kg	4594,38	4589,23	4409,42	4381,14	4449,07	4484,65	100,77	2,25
Calcium as Ca in mg/kg	3981,46	4172,56	3961,49	3855,60	3997,23	3993,67	114,31	2,86
Chromium as Cr in mg/kg	18,04	18,08	17,56	16,90	17,34	17,58	0,50	2,83
Copper as Cu in mg/kg	12,26	12,76	12,81	11,79	13,67	12,66	0,70	5,56
Iron as Fe in mg/kg	11341,44	12254,32	11632,08	11286,84	12361,28	11775,19	505,02	4,29
Potassium as K in mg/kg	526,21	536,56	505,79	497,54	495,14	512,25	18,28	3,57
Magnesium as Mg in mg/kg	971,70	990,57	948,72	914,93	936,39	952,46	29,59	3,11
Manganese as Mn in mg/kg	275,06	279,09	274,34	262,77	274,16	273,08	6,10	2,24
Sodium as Na in mg/kg	176,40	191,63	175,58	171,91	181,33	179,37	7,63	4,26
Nickel as Ni in mg/kg	10,76	10,56	10,09	10,02	10,43	10,37	0,32	3,05
Lead as Pb in mg/kg	37,57	44,61	36,69	32,51	38,25	37,93	4,35	11,48
Sulphur as SO ₄ in mg/kg	2149,69	2154,09	2129,89	2111,98	2189,85	2147,10	29,21	1,36
Zink as Zn in mg/kg	38,97	46,97	37,71	36,64	40,61	40,18	4,08	10,14
Phosphor as P ₂ O ₅ in mg/kg	1203,91	1212,66	1175,18	1147,35	1243,56	1196,53	36,75	3,07

Table A.2.3. 3 Results of open microwave digestion SO16R

	UB0118K	UB0118L	UB0118M	UB0118N	UB0118O	arithmetic mean	standard deviation	coefficient of variation
Arsenic as As in mg/kg	8,72	9,76	9,10	8,33	8,74	8,93	0,54	6,01
Mercury as Hg in mg/kg	0,12	0,15	0,11	0,11	0,11	0,12	0,02	14,35
Cadmium as Cd in mg/kg	0,43	0,47	0,45	0,44	0,45	0,45	0,01	3,33
Cobalt as Co in mg/kg	6,58	8,22	6,97	7,40	7,06	7,25	0,62	8,50
Aluminium as Al in mg/kg	7236,84	7090,22	7489,12	6972,59	8139,08	7385,57	463,25	6,27
Calcium as Ca in mg/kg	1241,03	1314,48	1305,90	1341,88	1257,41	1292,14	41,77	3,23
Chromium as Cr in mg/kg	14,85	15,14	16,62	14,90	15,11	15,32	0,74	4,80
Copper as Cu in mg/kg	15,25	16,63	15,63	15,79	15,21	15,70	0,57	3,66
Iron as Fe in mg/kg	22986,44	21410,08	20093,00	20381,41	23992,49	21772,68	1679,97	7,72
Potassium as K in mg/kg	741,63	766,78	827,66	734,01	706,24	755,26	45,87	6,07
Magnesium as Mg in mg/kg	1922,85	2022,51	2122,08	1949,74	1929,08	1989,25	84,17	4,23
Manganese as Mn in mg/kg	1008,77	1044,61	997,23	976,36	979,06	1001,21	27,68	2,76
Nickel as Ni in mg/kg	13,96	14,84	15,43	13,71	14,03	14,39	0,72	5,01
Lead as Pb in mg/kg	55,02	61,24	54,31	55,22	56,89	56,54	2,79	4,94
Sulphur as SO ₄ in mg/kg	1128,39	1160,13	1163,43	1159,12	1179,38	1158,09	18,50	1,60
Zinc as Zn in mg/kg	100,21	104,33	110,51	104,09	101,44	104,12	3,98	3,82
Phosphor as P ₂ O ₅ in mg/kg	1933,81	2095,20	2003,36	1943,78	1986,37	1992,51	64,27	3,23

A.2.4. Digestion with Aqua regia - Results of Certified Reference materials:

Table A.2.4. 1 Results of certified reference material WBQ1 (Lake Ontario Sediment) in mg/kg

	Open vessel microwave	Thermal heating	Closed vessel microwave			
	arithmetic mean of 3 digestions	arithmetic mean of 3 digestions	arithmetic mean of 4 digestions	value aqua regia soluble	Certified value total content	confidence interval 95%/2
Arsenic	21,3	23,2	21,9	23,1	23	1,84
Mercury	1,3	1,2	1,2		1,09	0,15
Cadmium	1,6	1,6	1,6	1,79		
Cobalt	16,7	16,6	16,6	18,1	20,1	9,3
Selenium	0,0	0,0	0,0	1,53	1,02	0,17
Aluminium	17251,6	28635,6	19324,7	58414	78134	32139
Bor	15,6	36,4	14,9	77,3		
Barium	238,0	268,4	243,2	413		
Calcium	8945,3	9861,1	9342,1	9915		
Cadmium	2,4	2,2	2,2	1,79		
Cobalt	21,3	23,1	21,7	18,1		
Chromium	44,4	59,6	48,2	77,2		
Copper	71,8	71,7	101,5	78,4	79,6	16,1
Iron	43940,8	49915,6	44327,3	47856	47358	10536
Potassium	2744,8	6618,4	3736,4	18183		
Lithium	34,2	44,1	37,3	54,6		
Magnesium	8564,7	10157,8	9089,9	12536		
Manganese	2345,6	2408,9	2331,7	2289	2237	349
Sodium	365,4	582,9	404,2	830		
Nickel	51,3	53,6	51,5	63,1	61,5	17,6
Lead	90,8	95,8	88,5	85	83,7	22,3
Sulphur	6579,6	7568,2	7328,5			
Strontium	33,5	47,2	36,8	67		
Zink	255,0	280,0	258,9	279	275	58
Phosphor as P2O5	2346,2	2984,4	3085,2	3240 as P		

Table A.2.4. 2 Results of certified reference material CRM143R (Sewage Sludge amended Soil) in mg/kg

	Closed microwave	Open microwave	Thermal heating				
	arithmetic mean of 3 digestions	arithmetic mean of 3 digestions	arithmetic mean of 3 digestions	Certified value aqua regia soluble	confidence interval 95%/2	Certified value total content	confidence interval 95%/2
Arsenic	11,1	10,7	10,8				
Mercury	1,2	1,2	1,2			1,1	0,07
Cadmium AAS	68,7	71,8	68,9	72	1,8	71,8	1,2
Cobalt AAS	10,3	10,9	10,8			12,3	0,3
Selenium	0,0	0,0	0,0				
Aluminium	9410,5	7466,0	12768,0				
Bor	5,1	7,2	13,8				
Barium	372,7	412,7	374,0				
Calcium	6478,6	6272,0	6814,1				
Cadmium ICP	72,0	73,4	71,8	72	1,8	71,8	1,2
Cobalt ICP	14,6	13,5	14,7			12,3	0,3
Chromium	396,9	378,5	415,5	426	12		
Copper	119,1	119,9	117,3			130,6	1,4
Iron	27044,4	26651,3	29136,7				
Potassium	1325,3	858,7	2390,9				
Lithium	12,0	9,7	15,7				
Magnesium	2286,5	2060,1	2645,3				
Manganese	821,3	813,2	833,6	858	11		
Sodium	158,3	154,0	221,1				
Nickel	294,3	289,7	290,4	296	4	299	5
Lead	173,5	177,5	166,9	174	5	179,7	2,1
Sulphur	1530,9	1306,4	1685,8				
Strontium	26,8	23,4	33,3				
Zink	1027,2	1073,5	1030,3	1063	16	1055	14
Phosphor as P2O5	7358,3	7166,9	7348,9				

A.2.5. Results of closed microwave digestion with performance variation:

Table A.2.5.Fehler! Kein Text mit angegebener Formatvorlage im Dokument.-3
mass of test portion 0,25-0,4 g

Closed microwave digestion with aqua regia at Eurofins according to method B with

	Ag	As	B	Ba	Cd	Co	Cr	Cu	Li	Mn	Mo	Ni	Pb	Sb	Se	Sr	Tl	V	Zn
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Detection limit		5	40	2	1	4	5	5	5	2	2	5	5	5	5	5	5	5	5
Soil SO 1	9,18	12,8	29,9	139	0,179	13,3	46,2	35,9	8,38	818	0,426	38,0	46,8	0	0	36,9	0	53,9	124
Soil SO 1	5,62	15,6	11,8	140	0,377	13,0	46,9	36,2	11,8	817	0,289	37,8	48,0	2,60	0	37,5	0	53,7	124
Soil SO 4	5,02	31,3	33,5	160	0,224	4,83	35,9	14,2	4,95	367	0	17,8	45,7	0,791	0	47,9	0	44,4	59,3
Soil SO 4	4,22	31,1	26,9	151	0,322	4,51	33,2	13,3	3,65	350	0,369	17,3	35,9	0	0	44,4	0	42,1	60,5
Soil SO 7	4,75	11,8	29,9	204	0,837	23,7	221	70,3	10,1	951	0,489	219	79,9	0	0	79,8	0	66,6	414
Soil SO 7	4,07	11,7	27,6	217	0,863	24,0	227	70,8	11,5	960	0,378	215	81,8	2,07	0	88,0	0	70,2	412
Soil SO 9	12,5	21,4	38,9	689	114	20,1	707	198	10,1	1126	21,3	591	284	2,34	0	63,7	0	58,4	2594
Soil SO 9	11,6	20,1	35,9	656	112	19,9	649	196	10,0	1095	19,8	571	284	7,85	0	60,1	0	52,6	2522
Slam SL 4	32,0	7,05	46,8	598	2,87	8,41	461	680	0	441	3,24	947	464	10,2	12,6	103	0	16,8	3430
Slam SL 4	26,1	5,61	47,8	583	3,61	8,32	470	681	0	437	3,72	949	461	6,76	0	103	0	15,7	3412
Slam SL 11	32,5	6,66	324	80,3	0,290	3,22	77,8	107229	0,0880	599	3,98	1676	10134	1,87	0	201	0	23,8	466
Slam SL 11	25,6	5,25	327	84,1	0,0534	3,82	83,4	107668	0	623	4,26	1724	10419	0	0,238	208	0	25,3	486
Kompost CW 1	75,3	16,7	88,2	1373	3,99	9,25	161	440	0	611	16,2	169	1126	44,1	4,77	184	0	20,8	1217
Kompost CW 1	52,2	22,9	92,7	2038	6,20	13,4	230	662	1,90	884	20,5	248	1611	29,7	9,92	273	0	30,2	1805

Table A.2.5. Fehler! Kein Text mit angegebener Formatvorlage im Dokument.-4
of test portion, time and temperature

Closed microwave digestion with aqua regia at UBA Vienna with variation of mass

			Al	B	Cd	Co	Cr	Cu	Fe	Ni	Pb	Zn
detection limit [mg/l]			20	0,05	0,002	0,008	0,048	0,04	20	0,04	0,12	0,2
detection limit [mg/kg]: 0,3 g EW			3333	8,3	0,30	1,3	8,0	6,7	3333	6,7	20	33
detection limit [mg/kg]: 0,5 g EW			2000	5,0	0,20	0,80	4,8	4,0	2000	4,0	12	20
Series	sample	mass of test portion [g]	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CZU method B	SO 4	0,3000	10169	<8.3	0,36	4,0	24,00	11,11	14240	12,08	32,68	46,64
CZU method B	SO 4	0,3007	9715	<8.3	0,32	3,9	23	11	14041	12	32	44
CZU method B	SO 4	0,2997	10639	<8.3	0,36	4,1	24	12	14596	12	31	47
CZU method B	SO 16R	0,2993	11541	<8.3	0,55	8,7	20	14	24592	16	55	120
CZU method B	SO 16R	0,2999	11500	<8.3	0,53	8,6	19	14	21419	16	79	113
CZV method B	SO 4	0,5001	9140	<5.0	0,32	3,9	22	11	14321	12	34	44
CZV method B	SO 4	0,5000	8990	<5.0	0,30	3,9	22	11	13971	12	33	44
CZV method B	SO 4	0,4998	8790	<5.0	0,31	3,8	21	11	14058	12	34	45
CZV method B	SO 16R	0,5002	11425	<5.0	0,54	8,5	19	15	21581	16	53	111
CZV method B	SO 16R	0,4996	11862	<5.0	0,55	8,4	20	14	22871	16	52	115
CZW high temp	SO 4	0,2996	21386	12	0,49	4,7	40	12	16070	14	31	52
CZW high temp	SO 4	0,2995	21587	12	0,55	4,5	42	12	16220	15	34	53
CZW high temp	SO 4	0,3006	22101	12	0,54	4,7	44	12	16329	15	33	54
CZW high temp	SO 16R	0,3005	29824	14	0,79	9,4	42	14	25322	19	51	132
CZW high temp	SO 16R	0,2996	30909	14	0,86	10	42	15	27043	19	53	135
CZX high temp	SO 4	0,4998	21888	11	0,46	4,7	42	12	16278	15	34	52
CZX high temp	SO 4	0,4999	21907	11	0,47	4,8	42	12	16315	15	31	53
CZX high temp	SO 4	0,4998	22214	11	0,49	4,8	42	12	16166	15	35	51
CZX high temp	SO 16R	0,5001	29182	13	0,80	9,3	41	14	25935	18	51	133
CZX high temp	SO 16R	0,4992	29401	13	0,78	9,1	39	14	24416	18	49	125

A.2.6. Digestion with Aqua regia - Comparison of performance variations of closed microwave digestion:

Table A.2.6.1 Closed microwave digestion of sludge SL4 - comparison of data of NUA and Eurofins with different masses of test portions

Sludge SL4	NUA					Eurofins					
	UB0111 A mg/kg	UB0111 B mg/kg	UB0111 C mg/kg	arith metic mean mg/kg	standar d deviati on	coeff of variati on	91263 8-09 1 mg/kg	91263 8-09 2 mg/kg	arith metic mean mg/kg	standar d deviati on	coeff of variati on
Arsenic - AAS	6,29	5,94	5,75	5,99	0,27	4,56	7,05	5,61	6,33	1,01	16,03
Cadmium - AAS	3,25	3,25	3,21	3,24	0,03	0,79	2,87	3,61	3,24	0,52	15,99
Cobalt - AAS	8,03	7,69	6,70	7,47	0,69	9,27	9,05	8,56	8,81	0,35	3,94
Silver - AAS	15,77	16,67	16,20	16,21	0,45	2,78	15,16	14,11	14,64	0,75	5,11
Bor	28,6	29,5	28,8	29,0	0,48	1,67	46,8	47,8	47,3	0,65	1,38
Barium	479	439	510	476	35,44	7,44	598	583	590	11,04	1,87
Calcium	36267	35486	36753	36169	639	1,77	40094	41193	40643	777	1,91
Cadmium	3,71	3,91	4,10	3,91	0,19	4,95	2,87	3,61	3,24	0,52	15,99
Cobalt	13,00	13,68	13,30	13,33	0,34	2,53	8,41	8,32	8,36	0,07	0,78
Chromium	445	437	454	445	8,35	1,88	461	470	466	6,65	1,43
Copper	657	640	613	636	22,10	3,47	680	681	681	0,29	0,04
Potassium	902	930	973	935	35,55	3,80	1930	1555	1742	264,99	15,21
Magnesium	4455	4606	4527	4529	75,33	1,66	4898	5080	4989	128,50	2,58
Manganese	418	396	415	410	11,81	2,88	441	437	439	2,64	0,60
Sodium	1234	1267	1228	1243	21,03	1,69	748	618	683	91,92	13,46
Nickel	861	827	927	872	50,93	5,84	947	949	948	1,46	0,15
Lead	475	469	485	476	7,96	1,67	464	461	462	2,61	0,56
Strontium	101	104	104	103	1,48	1,44	103	103	103	0,01	0,01
Zink	2906	2845	3109	2953	138,48	4,69	3430	3412	3421	12,69	0,37

Table A.2.6.2 Comparison Closed Microwave digestion/Thermal heating for sample SO4 - Cadmium

Soil SO 4	Cadmium in mg/kg						mean	standard deviation	coefficient of variation
NUA Thermal heating	0,235	0,227	0,217	0,232	0,230		0,228	0,007	3,0
NUA method B	0,237	0,236	0,240	0,240	0,254		0,241	0,007	3,1
Kassel	1,033	1,090	1,057				1,060	0,028	2,7
Eurofins method B	0,224	0,322	0,392	0,378			0,329	0,076	23,1
UBA method B	0,320	0,300	0,308	0,360	0,323	0,363	0,329	0,026	8,0
UBA high temperature	0,485	0,551	0,541	0,464	0,474	0,492	0,501	0,036	7,2

Table A.2.6.3 Comparison Closed Microwave digestion/Thermal heating for sample SO4 – Chromium

Soil SO 4	Chromium in mg/kg						mean	standard deviation	coefficient of variation
NUA Thermal heating	27,6	26,8	26,8	26,9	26,4		26,9	0,4	1,6
NUA method B	21,4	22,4	21,7	21,7	23,0		22,0	0,7	3,0
Kassel	31,9	33,6	34,5				33,3	1,3	4,0
Eurofins method B	35,9	33,2					34,5	1,9	5,5
UBA method B	22,0	21,7	21,0	24,0	22,5	24,3	22,6	1,3	5,8
UBA high temperature	39,9	42,0	43,9	42,4	41,8	41,7	42,0	1,3	3,1

Table A.2.6.4 Comparison Closed Microwave digestion/Thermal heating for sample SO4 – Copper

Soil SO 4	Copper in mg/kg						mean	standard deviation	coefficient of variation
NUA Thermal heating	13,2	13,4	13,3	13,3	13,5		13,4	0,1	0,9
NUA method B	12,3	12,6	12,3	12,6	12,5		12,5	0,2	1,2
Kassel	13,8	14,4	13,2				13,8	0,6	4,1
Eurofins method B	14,2	13,3					13,8	0,6	4,2
UBA method B	11,4	10,9	11,2				11,2	0,3	2,3
UBA high temperature	12,0	12,0	12,3	12,0	11,9	11,8	12,0	0,2	1,4

Table A.2.6.5 Comparison Closed Microwave digestion/Thermal heating for sample SO4 – Lead

Soil SO 4	Lead in mg/kg						mean	standard deviation	coefficient of variation
NUA Thermal heating	33,3	36,4	38,9	36,1	39,5		36,9	2,5	6,7
NUA method B	39,5	36,3	38,5	41,7	38,1		38,8	2,0	5,1
Kassel	40,1	42,1	48,5				43,6	4,4	10,1
Eurofins method B	45,7	35,9					40,8	6,9	17,0
UBA method B	34,1	32,8	33,5	32,7	32,2	31,3	32,8	1,0	3,0
UBA high temperature	31,3	33,9	32,8	33,8	31,2	35,4	33,1	1,6	4,9

Table A.2.6.6 Comparison Closed Microwave digestion/Thermal heating for sample SO4 – Nickel

Soil SO 4	Nickel in mg/kg						mean	standard deviation	coefficient of variation
NUA Thermal heating	15,3	14,4	14,3	14,5	14,3		14,6	0,4	2,7
NUA method B	12,1	12,3	12,6	12,2	12,4		12,3	0,2	1,7
Kassel	15,8	15,4	15,4				15,5	0,2	1,4
Eurofins method B	17,8	17,3					17,6	0,4	2,3
UBA method B	11,8	11,6	11,5	12,1	12,1	12,5	11,9	0,4	3,1
UBA high temperature	14,4	14,8	14,9	14,8	14,9	15,0	14,8	0,2	1,3

Table A.2.6.7 Comparison Closed Microwave digestion/Thermal heating for sample SO4 – Zink

Soil SO 4	Zink in mg/kg						mean	standard deviation	coefficient of variation
NUA Thermal heating	58,1	61,9	57,2	59,1	55,7		58,4	2,3	4,0
NUA method B	48,5	51,9	51,3	49,1	52,2		50,6	1,7	3,3
Kassel	58,1	54,3	51,5				54,6	3,3	6,0
Eurofins method B	59,3	60,5					59,9	0,9	1,5
UBA method B	44,4	44,2	44,5	46,6	44,4	47,3	45,3	1,4	3,0
UBA high temperature	51,5	52,6	54,0	52,2	52,5	51,4	52,4	0,9	1,8

A.2.7 Digestion with Aqua regia - Results of Validation of EN 13657:

SAMPLE CEN10/99 "SEWAGE SLUDGE" (BCR 146R)

	<i>Method A: Microwave assisted with aqua regia in closed vessel</i>									<i>Method - B: Microwave assisted, with aqua regia in semi-open vessel</i>						<i>Method C: Thermal heating, with aqua regia in reflux systems</i>										
	N	L	NA	XREF mg/kg	Mean mg/kg	Recov %	Reprod %	Repeat %		N	L	NA	XREF mg/kg	Mean mg/kg	Recov %	Reprod %	Repeat %		N	L	NA	XREF mg/kg	Mean mg/kg	Recov %	Reprod %	Repeat %
Al	79	20	0	25130	20652	82,2	19	6,1		20	6	1	25130	18943	75,4	13,7	2,1		37	9	0	25130	21230	84,5	25,4	5,4
Sb	29	7	2	16,25	9,33	57,4	21,5	7,6		13	4	0	16,25	11,28	69,4	31,9	5,2		19	5	0	16,25	7,24	44,6	55,8	4,8
As	29	8	4	6,3	5,52	87,6	31	11,6		13	3	0	6,3	8,39	133,3	34,9	12,5		29	7	0	6,3	6,32	100,3	53,3	40,3
B	23	6	0		38,7		37,3	15		11	3	0		30,87		33,8	6		15	4	0		21,9		15	16,8
Ba	63	15	0	735	572,8	77,9	20	4,6		19	5	1	735	391,8	53,3	16,9	7,7		23	5	0	735	479,3	65,2	13,9	13,7
Be	22	5	4		0,75		5,7	6,1		4	1	0		1,09		-	9,1		13	3	0		0,88		21,7	10,2
Cd	82	20	14	18,76	17,15	91,4	8,8	4,5		22	6	4	18,76	15,75	84	13	2,3		45	11	0	18,76	16,26	86,7	14,8	9,6
Ca	60	14	0	154600	140455	90,9	8,7	3,7		18	5	5	154600	145312	94	7,3	1,4		27	6	1	154600	154356	99,8	17	4,4
Cr	103	25	0	196	164,6	84	13,6	3,4		27	8	4	196	157,5	80,3	12,3	4,4		45	10	4	196	163,6	83,4	13,7	3,3
Co	64	17	0	7,39	6,08	82,3	19,2	5,7		22	7	0	7,39	7,59	102,8	37,4	22,5		31	8	0	7,39	6,49	87,8	35,1	8,4
Cu	112	27	0	837,9	806,7	96,3	13,3	7,3		35	10	5	837,9	798,9	95,3	9,4	2,3		30	7	9	837,9	765,6	91,4	3	2,7
Fe	89	22	0	16100	13889	86,3	11,7	3,6		21	6	5	16100	13922	86,5	6,8	1,9		34	8	5	16100	13500	83,9	12,2	5
Pb	98	24	0	608,7	530,8	87,2	13,3	3,4		31	8	0	608,7	562,9	92,5	7,6	1,7		42	10	5	608,7	534,0	87,7	10,1	3,3
Mg	64	15	0	10460	9031,3	86,3	9,3	3,3		21	6	5	10460	8449,2	80,8	8,1	1,9		30	7	1	10460	9446,1	90,3	17,8	8,5
Mn	92	23	0	323,5	274,4	84,8	10,9	2,8		37	9	0	323,5	281,4	87	8,6	1,6		43	10	0	323,5	262,9	81,3	14,3	3,1
Hg	41	10	0	8,62	7,39	85,7	25,1	10,8		18	5	0	8,62	8,73	101,3	16,8	6,9		31	7	0	8,62	7,06	81,9	27,2	12,2
Mo	32	8	4		7,95		8,1	5,2		15	4	0		8,51		21,3	5,7		16	4	0		8,67		13,2	2,9
Ni	105	26	0	69,7	62,54	89,7	21,7	4,6		31	8	0	69,7	59,17	84,9	15,3	2,7		49	11	0	69,7	58,08	83,3	18,1	5,4
P	31	7	1	25600	27658	108	2,4	2,8		24	6	0	25600	30286	118,3	17,5	5		14	3	0	25600	28756	112,3	11,3	9,3
K	56	14	0	5240	2025,6	38,7	34,7	17,3		16	5	1	5240	1306,2	24,9	24,8	9,4		30	7	5	5240	1313,8	25,1	33,7	5,3
Se	13	3	0		4,74		60	12,3		4	1	0		3,33		-	7,9		2	1	0		2,67		-	-
Ag	38	9	0		190,9		23,1	1,9		24	6	0		205,9		6,6	5,2		18	4	1		198,8		4,4	1,1
S	26	6	0	10620	9188,4	86,5	17,7	2,4		2	1	0	10620	9180,0	86,4	-	-		10	2	0	10620	9021,6	84,9	15,4	8,7
Na	44	11	6	1804	777,0	43,1	28,1	4,3		6	2	0	1804	481,8	26,7	5,9	10,1		41	9	0	1804	701,3	38,9	55,2	18,3
Sr	46	11	5	1179	1027,2	87,1	4,9	2		11	3	1	1179	975,1	82,7	4,4	2,4		19	4	0	1179	1019,6	86,5	10,6	1,3
Sn	30	7	3	95,8	59,79	62,4	32,5	6,3		15	4	0	95,8	61,15	63,8	33	3,8		14	3	0	95,8	63,94	66,7	28,6	4,6
Te	0	0	0							0	0	0							0	0	0					
Tl	4	1	0		4,12		-	8,7		4	1	0		0,55		-	11,9		4	1	0		0,5		-	7,7
Ti	30	7	0	2771	299,8	10,8	57,6	21,5		21	6	0	2771	182,8	6,6	59,4	19		14	3	0	2771	183,6	6,6	34,1	7,2
V	50	12	8	42,7	34,14	80	8,6	3,3		14	4	8	42,7	27,76	65	3,4	2,8		26	6	0	42,7	46,25	108,3	47,9	4,8
Zn	108	26	0	3061	2813,5	91,9	10,8	4,5		31	8	0	3061	2761,8	90,2	7,1	3,1		43	10	6	3061	2810,0	91,8	12,1	6,5

SAMPLE CEN9/99 "SEWAGE SLUDGE SL11 POWDER"

	<i>Method A: Microwave assisted with aqua regia in closed vessel</i>						<i>Method - B: Microwave assisted, with aqua regia in semi-open vessel</i>						<i>Method C: Thermal heating, with aqua regia in reflux svstems</i>											
	N	L	NA	XREF mg/kg	Mean mg/kg	Recov %	Reprod %	Repeat %	N	L	NA	XREF mg/kg	Mean mg/kg	Recov %	Reprod %	Repeat %	N	L	NA	XREF mg/kg	Mean mg/kg	Recov %	Reprod %	Repeat %
Al	67	16	5		81848		6,7	2,5	21	6	1		77368		16,7	1,7	29	7	0		79678		24,6	6,4
Sb	16	4	0		19,49		103,9	25,6	5	2	1		2,57		29,7	0,5	3	1	1		2,2		-	8,6
As	19	5	4		4,43		78,1	22,2	4	1	0		5,55		-	10,1	17	5	0		4,03		58,5	16,2
B	33	8	2		279,9		15,6	3,4	12	3	1		282,6		14,1	0,9	19	4	0		328,1		28,4	16,6
Ba	51	12	8		76,52		8,6	2,7	22	6	4		75,52		4,5	1,2	27	6	0		61,8		18,9	7,9
Be	13	3	0		1,79		147,8	29,3	0	0	0						5	1	0		1,45		-	17,6
Cd	30	7	20		0,23		32,1	16	14	3	0		0,9		153,6	29,5	14	3	4		0,74		142,8	73,8
Ca	60	14	0		57232		11	5,9	19	5	5		58797		4	5,8	21	5	0		58521		17,2	2,6
Cr	92	23	10		77,24		10,2	4	31	8	0		73,0		10,2	2,9	40	9	4		78,47		19,6	5,8
Co	39	11	4		4,59		24,9	8,6	12	4	0		5,43		48,1	52,5	26	6	0		3,16		53,5	12,4
Cu	96	23	5		96534		13,2	3,5	31	8	0		93526		6,3	1,4	31	7	13		91351		3,3	2,6
Fe	81	20	7		4440,3		11	3,6	26	7	0		4437,7		4,2	2,3	43	10	4		4021,1		10,6	7,2
Pb	96	23	7		9327,5		11,2	2,9	31	8	0		9323,8		3,5	1,2	33	8	14		9305,6		5,6	3,6
Mg	60	14	0		2309,1		14,2	4,2	21	6	4		2177,3		5	2,9	21	5	0		1992,1		19	5,6
Mn	92	23	5		590,2		12,2	3	31	8	0		583,8		3,6	1,4	46	11	5		587,6		9	2,8
Hg	27	7	12		0,14		52,7	10,8	10	2	0		0,33		21,8	8,4	15	3	4		0,19		46,7	9,7
Mo	22	6	1		4,33		11,1	6,4	14	3	0		4,59		62,2	11,9	13	3	0		3,56		6,8	7,4
Ni	100	25	5		1729,6		10,6	3,3	26	7	5		1720,0		5,5	1,7	40	9	9		1568,6		18,7	6,1
P	18	4	10		4724,5		3,8	6,3	22	5	0		5834,6		33,9	5,6	13	3	0		4012,9		24,7	6,7
K	48	12	4		629,5		39,1	6,8	11	3	0		436,3		31,7	5,5	21	5	0		467,8		58,6	3,8
Se	8	2	0		7,03		110,2	14	0	0	0						0	0	0					
Ag	28	7	0		10,53		14,7	13,1	18	4	0		7,73		20,5	11,8	18	4	0		9,68		21	7
S	26	6	0		61982		8,8	1,7	7	2	0		60496		2,6	2,5	10	2	0		59698		12,8	1,8
Na	64	15	0		11041		22,7	6	7	2	0		12596		7,7	1,3	28	6	1		11805		10,8	4,3
Sr	41	10	10		200,8		5,6	2,4	15	4	0		197,3		3,3	2,2	18	4	0		195,2		9,5	2,2
Sn	35	8	5		19155		5,2	6,6	15	4	0		16768		15,1	5,1	14	3	0		17840		18,2	1,8
Te	0	0	0						0	0	0						0	0	0					
Tl	6	2	0		18,65		203	9,6	0	0	0						0	0	0					
Ti	21	5	0		29,78		28,2	8,9	8	3	4		26,34		10,1	0,5	12	3	0		24,64		35,7	3
V	25	7	14		6,36		17,6	2,3	15	4	0		8,09		63,9	28,8	18	4	5		6,83		77,1	32,3
Zn	99	24	4		228,1		34,9	5,5	31	8	0		323,3		44,6	7	48	11	5		209,6		35,5	23

SAMPLE CEN8/99 "INK WASTE CW12 POWDER"

	<i>Method A: Microwave assisted with aqua regia in closed vessel</i>								<i>Method - B: Microwave assisted, with aqua regia in semi-open vessel</i>							<i>Method C: Thermal heating, with aqua regia in reflux systems</i>								
	N	L	NA	XREF mg/kg	Mean mg/kg	Recov %	Reprod %	Repeat %	N	L	NA	XREF mg/kg	Mean mg/kg	Recov %	Reprod %	Repeat %	N	L	NA	XREF mg/kg	Mean mg/kg	Recov %	Reprod %	Repeat %
Al	72	18	2		1387,8		22,5	8,7	22	6	4		1250,9		10,6	3	37	9	0		1225,2		26,9	8,1
Sb	28	7	0		53,65		89,8	12,4	6	2	0		23,58		64,4	15,8	8	2	0		30,3		116,9	1,4
As	30	7	5		5,71		34,1	14,6	5	2	1		5,74		17,3	0,8	22	6	4		6,33		10,6	4,1
B	24	6	4		44,06		68,7	6	13	3	0		113,7		76,4	21,4	11	3	0		22,06		75,5	18,9
Ba	64	15	0		97,43		19,1	8,3	24	6	2		75,61		25,2	7,6	23	5	0		80,11		9,6	12,9
Be	13	3	0		0,42		116,9	8,9	0	0	0						9	2	0		0,17		44,8	31,2
Cd	70	18	6		4,59		117,3	12,1	18	4	5		0,99		79,5	24,3	21	5	0		0,72		58,9	40,9
Ca	56	13	0		115640		8,5	5,2	24	6	0		120616		6,3	4,9	33	7	0		116663		7,3	4,8
Cr	104	25	5		3624,0		11,4	4,9	30	8	1		3710,9		11,4	2,3	54	12	0		3529,9		12,4	6,6
Co	67	17	4		14,56		23,1	5,8	13	4	5		16,55		19,9	6,4	40	9	0		14,3		19,1	10,1
Cu	113	27	2		12285		10,3	3,1	31	8	0		12703		9,1	2,4	53	12	1		12782		14,5	6,6
Fe	87	21	0		76961		9,7	4,9	26	7	0		78738		8,3	1,6	44	10	0		73215		10,8	9,6
Pb	99	24	0		5855,9		7,9	4	27	7	4		6033,8		8,3	1,9	52	12	0		6042,2		13,5	5,7
Mg	57	14	2		1039,5		22	5	25	7	1		954,7		11,8	2,7	24	5	0		942,9		13,6	8
Mn	97	24	4		544,3		8,7	4	31	8	0		558,8		10,8	2,5	52	12	0		521,1		7,7	4
Hg	45	12	5		2,0		41,3	14,9	15	4	1		2,29		27,7	3	27	6	0		1,94		18,3	14,1
Mo	16	4	0		3,95		39,9	14,9	9	3	5		3,2		14,8	3,5	14	3	0		3,3		1,4	19,7
Ni	91	23	9		20,67		31,8	10,5	21	5	0		21,14		13,7	5	45	10	1		22,49		39	23,4
P	28	6	0		14215		3,2	2,2	24	6	0		13350		18	2,6	19	4	0		13305		6,2	2,5
K	56	14	1		997,3		47,9	14,2	17	5	0		875,5		44,4	4,3	26	7	0		661,5		75,6	8,6
Se	7	2	1		5,67		2,1	13,3	4	1	0		3,55		-	21,1	4	1	0		2,9		-	10,7
Ag	17	5	0		4,34		72	58,6	5	1	0		0,78		-	1,6	7	2	0		1,79		3,8	4,6
S	23	5	1		28708		9,4	2,4	0	0	0						10	2	0		27399		11,2	1,6
Na	54	13	5		4664,4		22,4	2,6	7	2	0		5685,4		17,3	2,5	33	7	0		5265,5		32,9	8,4
Sr	47	11	0		121,5		14,5	3,4	17	5	0		112,6		7	2,4	18	4	0		108,4		9,4	1,3
Sn	12	3	0		8,64		110,8	2,7	0	0	0						2	1	0		1,18		-	2,2
Te	0	0	0						5	1	0		20,8		-	7,9	0	0	0					
Tl	13	3	0		62,47		75,8	4,4	0	0	0						3	1	0				-	32,7
Ti	18	5	5		96,75		4,2	5,5	11	4	1		71,82		11,2	2,6	14	3	0		78,84		5,3	27,8
V	43	10	1		16,18		34,2	5,9	16	4	0		17,24		28,9	13,3	22	5	5		16,97		33,2	20,5
Zn	103	25	7		1173,2		11,5	3,2	31	8	0		1346,6		13,2	5,8	44	10	6		1136,5		9,3	6,6