Supplementary Information (Part I) to:

Determination of major and trace element variability in healthy human urine by ICP-QMS and specific gravity normalisation

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Table S1: Sources of major and trace elements measured in this study in commonly eaten food and drink.

Element	Food source	Ref(s).
Na	Table salt, cured meat and fish, egg	1, 2
Mg	Seeds, cereals, nuts, spinach, chocolate, meat, dairy products	1, 2, 3
K	Nuts, dried fruit, root vegetables, tomato, pepper, leek, pulses, avocado, banana, chocolate, orange juice, milk, tea, coffee	1, 2, 3
Ca	Milk, yogurt, cheese, fish (e.g. salmon, sardines), tofu, vegetables (e.g. broccoli, turnip)	1, 2
Co	Meat, fish, shellfish, leafy vegetables, legumes, nuts, seeds	2, 3
Cu	Liver, cocoa powder, nuts, legumes, shellfish	2,3, 4
Zn	Meat, fish, shellfish, legumes, nuts, seeds, bread	1, 2, 3
As	Seafood, water, cereals	2, 5, 6
Rb	Asparagus, lettuce, carrot, black tea, coffee, cocoa	7
Sr	Seafood, gram, nuts, kale, tea	8
Mo	Legumes, leafy vegetables, liver, cereals, nuts, milk	2, 4
Pb	Water, milk, spinach, chocolate, cereal	9, 10

Table S2: Operational conditions of ICP-QMS

	'No gas' mode	He mode	H_2 mode
RF power		1550 W	
Plasma gas flow		15 l/min	
Carrier gas flow		1.03–1.07 l/min	
Dilution gas flow		0.00 l/min	
CRC gas flow	–	5 ml/min (He 99.9995%)	6 ml/min (H_2 99.9999%)
Octopole bias	–8.0 V	–18.0 V	–18.0 V
Cell entrance	–30 V	–40 V	–40 V
Cell exit	–50 V	–60 V	–60 V
Deflect	13.2 V	1.4 V	–0.4 V
Plate bias	–40 V	–60 V	–60 V
Nebuliser type		Micromist	
Data acquisition parameters			
m/z isotopes measured	^{59}Co, ^{65}Cu, ^{66}Zn, ^{75}As, ^{85}Rb, ^{88}Sr, ^{95}Mo, ^{206}Pb, ^{207}Pb, ^{208}Pb	^{23}Na, ^{24}Mg, ^{39}K, ^{44}Ca, ^{59}Co, ^{63}Cu,^{65}Cu, ^{66}Zn, ^{75}As, ^{85}Rb, ^{88}Sr, ^{95}Mo, ^{206}Pb, ^{207}Pb, ^{208}Pb	^{23}Na, ^{24}Mg, ^{39}K, ^{40}Ca
m/z internal standards	^{103}Rh, ^{115}In	^{103}Rh, ^{115}In	^{103}Rh, ^{115}In

Table S3: Major and trace element concentrations determined for Trace Elements Urine L-1

Element	LOQ[a]	Trace Elements Urine L-1, LOT 1403080		
	H_2 mode / He mode	H_2 mode	He mode	Reference[b]
	µg / ml	**µg / ml**	**µg / ml**	**µg / ml**
^{23}Na	0.1 / 0.1	2803 ± 81	2670 ± 137	2780[c, d]
^{24}Mg	0.01 / 0.01	76.6 ± 4.2	79 ± 4	77.6 ± 17.4[d]
^{39}K	0.1 / 0.3	1980 ± 92	1979 ± 195	1901[c, d]
^{40}Ca	0.008 / -	109 ± 4		107[c, d]
^{44}Ca	- / 0.16		114 ± 8	107[c, d]
	'No gas' /He mode	'No gas' mode	He mode	Reference[b]
	ng / ml	**ng / ml**	**ng / ml**	**ng / ml**
^{59}Co	0.16 / 0.08	0.90 ± 0.17	0.78 ± 0.15	0.80 ± 0.16
^{63}Cu	- / 0.7		19.9 ± 3.5	20 ± 4
^{65}Cu	0.7 / -	21.7 ± 4.0		20 ± 4
^{66}Zn	0.3 / 0.15	365 ± 78	379 ± 79	347 ± 70
^{75}As	- / 0.5		151 ± 23	158 ± 32
^{85}Rb	0.6 / 0.6	1117 ± 136	1193 ± 163	1150[c]
^{88}Sr	0.1 / 0.1	103 ± 13	104 ± 11	119[c]
^{95}Mo	0.25 / 0.25	42.6 ± 2.7	40.3 ± 2.8	47.1 ± 9.5
Pb[e]	0.1 / 0.03	0.75 ± 0.18	0.71 ± 0.19	0.72 ± 0.36

The uncertainties of sample concentrations denote 1SD (standard deviation; n=2 for Na, Mg, K and Ca and n=5 for all other elements).

[a] LOQ = Limit of quantification (for He mode and H_2 mode or 'no gas' mode and He mode respectively).

[b] Reference data obtained using sector field (SF) ICP-MS and have expanded uncertainties with coverage factor k=2 at the 95 % confidence interval).[11]

[c] Additional approximate values, not certified

[d] Average of values determined by SF-ICP-MS and inductively coupled plasma optical emission spectroscopy (ICP-OES).

[e] Pb concentrations are calculated based on the average intensity of three lead isotopes: ^{206}Pb, ^{207}Pb and ^{208}Pb.

Table S4: Major and trace element concentrations determined for bovine muscle ERM-BB184 and Human blood serum BCR-639.

Isotope	Bovine muscle ERM-BB184				Human blood serum BCR-639			
	LOQ[a]	This study n=		Reference[b]	LOQ[a]	This study, n=2		Reference[b]
	'No gas' / He mode	'No gas'	He mode		'No gas' / He mode	'No gas'	He mode	
	µg / g		**µg / g**	**µg / g**	**µg / ml**		**µg / ml**	
^{23}Na	- / 15		1861	1804[c]	- / 4		3454 ± 136	
^{24}Mg	- / 8		1060	997[c]	- / 0.25		22.3 ± 0.3	
^{39}K	- / 250		15774	15844[c]	- / 7.2		176 ± 37	
^{44}Ca	- / 85		257	155[c]	- / 2.4		119 ± 15	
	µg / g		**µg / g**	**µg / g**	**ng / ml**	**ng / ml**	**ng / ml**	**ng / ml**
^{59}Co	0.006 / 0.007	0.012	0.012		0.8 / 0.8	1.20 ± 0.18	0.99 ± 0.06	
^{63}Cu	- / 0.08		2.29	2.31 ± 0.09	- / 12		1056 ± 10	
^{65}Cu	0.08 / 0.08	2.35	2.35	2.31 ± 0.09	12 / 12	1090 ± 16	1077 ± 12	
^{66}Zn	0.18 / 0.12	153	158	146 ± 7	26 / 17	2750 ± 3	3676 ± 25	2360 ± 140
ID Zn[d]		151.5 ± 0.4[e]		146 ± 7		2410 ± 100[e]		2360 ± 140
^{75}As	- / 0.04		<0.04	0.020 ± 0.003	- / 6		<6	
^{85}Rb	0.04 / 0.04	7.49	7.72		6 / 6	157 ± 9	169 ± 14	
^{88}Sr	0.008 / 0.008	0.109	0.12		1.2 / 1.2	45.2 ± 0.1	45.4 ± 1.6	
^{95}Mo	- / 0.05		<0.05		- / 15		<15	
Pb[f]	0.003 / 0.003	0.011	0.01	0.0014-0.0158[g]	0.4 / 0.4	2.77 ± 0.44	2.22 ± 0.24	

The uncertainties of sample concentrations (where shown) denote 1SD (standard deviation):

[a] LOQ = Limit of quantification

[b] Reference data have expanded uncertainties with coverage factor k=2 at the 95 % confidence interval[12,13]

[c] Additional values, not certified

[d] Determined by ID-MC-ICP-MS

[e] Values from Moore et al. 2017[14]

[f] Lead concentrations are calculated based on the average intensity of three lead isotopes: ^{206}Pb, ^{207}Pb and ^{208}Pb.

[g] Not certified; Lead concentrations are likely to be non-homogenous in the sample

Table S5: Matrices of the correlation coefficients r and r^2 determined from the results of the 65 individual samples

r	Na	Mg	K	Ca	Co	Cu	Zn	As	Rb	Sr	Mo
Na	-										
Mg	0.06	-									
K	0.48	0.11	-								
Ca	0.09	0.29	0.00	-							
Co	0.02	0.37	0.14	-0.45	-						
Cu	0.12	0.20	-0.02	-0.15	0.12	-					
Zn	-0.32	-0.06	-0.38	0.24	-0.40	0.42	-				
As	-0.22	0.04	-0.11	0.25	-0.09	-0.23	0.04	-			
Rb	0.37	0.13	0.90	-0.13	0.21	0.01	-0.33	-0.16	-		
Sr	0.24	0.39	0.12	0.81	-0.23	0.04	0.23	0.01	0.04	-	
Mo	0.28	0.19	0.09	-0.08	0.18	0.38	-0.25	-0.02	0.02	-0.04	-
Pb	0.36	0.30	0.15	0.23	0.20	0.14	0.08	0.17	0.13	0.47	0.12

r^2	Na	Mg	K	Ca	Co	Cu	Zn	As	Rb	Sr	Mo
Na	-										
Mg	0.00	-									
K	0.23	0.01	-								
Ca	0.01	0.08	0.00	-							
Co	0.00	0.13	0.02	0.20	-						
Cu	0.01	0.04	0.00	0.02	0.01	-					
Zn	0.10	0.00	0.15	0.06	0.16	0.18	-				
As	0.05	0.00	0.01	0.06	0.01	0.05	0.00	-			
Rb	0.14	0.02	0.81	0.02	0.04	0.00	0.11	0.03	-		
Sr	0.06	0.15	0.01	0.66	0.05	0.00	0.05	0.00	0.00	-	
Mo	0.08	0.04	0.01	0.01	0.03	0.14	0.06	0.00	0.00	0.00	-
Pb	0.13	0.09	0.02	0.05	0.04	0.02	0.01	0.03	0.02	0.22	0.01

White: low r and r^2, green: $0.4 < r < 0.5$, $0.2 < r^2 < 0.8$, red: $r > 0.8$, $r^2 > 0.65$.

Table S6: Daily mean urinary element concentrations of the study participants P1 to P10.

Participant (n - d)	Na µg/ml	Mg µg/ml	K µg/ml	Ca µg/ml	Co ng/ml	Cu ng/ml	Zn ng/ml	As ng/ml	Rb ng/ml	Sr ng/ml	Mo ng/ml	Pb ng/ml
P1 (8 - 2)	3351	98.5	3655	220	0.20	9.22	530	82.5	2143	177	27.3	0.73
P2 (6 - 2)	5535	112	5132	139	0.42	10.1	202	42.8	2052	183	64.8	0.97
P3 (5 - 1)	1466	117	3519	213	0.41	10.1	318	187	1352	159	41.8	0.74
P4 (9 - 2)	3320	114	4654	158	0.54	12.5	220	75.6	1950	124	92.4	0.46
P5 (4 - 1)	5318	161	6489	132	1.83	12.6	96.4	3.52	2821	229	95.1	0.96
P6 (8 - 2)	2395	110	4167	16.9	1.56	10.4	134	22.0	2203	58.4	31.6	0.61
P7 (9 - 2)	3265	98.5	3222	217	0.14	8.89	300	5.68	1722	231	32.7	0.60
P8 (4 - 1)	5958	60.5	2499	104	0.25	14.6	468	3.73	1446	109	66.4	0.66
P9 (7 - 2)	2028	62.7	2235	117	0.17	14.7	683	9.41	1244	143	41.3	0.54
P10 (5 - 1)	4144	134	5989	181	0.21	13.7	414	7.46	2255	239	64.3	0.76
Mean	3678	107	4156	150	0.57	11.7	336	43.9	1919	165	55.8	0.70
Median	3335	111	3911	148	0.33	11.4	309	15.7	2001	168	53.1	0.69
SD	1457	29	1340	60	0.58	2.1	177	55.3	460	56	23.4	0.16
CV (%)	40	27	32	40	101	18	53	126	24	34	42	23

Participants: n = number of samples; d = length of sampling period in days.

Deviation from the median value for all participants by a factor of:
1-0.75 and 1-1.25 (white)
0.76-0.50 and 1.26-1.50 (green)
0.49-0.25 and 1.51-2.00 (yellow)
<0.25 and >2 (red)

Table S7a: Coefficients of variation (CV values in %) for element concentrations of urine samples collected on a single day for the study participants P1 to P10.

CV values (%)	Na	Mg	K	Ca	Co	Cu	Zn	As	Rb	Sr	Mo	Pb
P1 - Day 1	21	11	34	21	20	18	22	19	31	14	39	12
P1 - Day 2	53	37	75	58	27	12	31	55	76	40	21	15
P2 - Day 1	6	7	41	32	21	15	47	11	25	29	56	9
P2 - Day 2	15	61	33	15	40	25	91	21	28	14	43	17
P3	14	22	79	39	49	38	40	102	54	26	34	33
P4 - Day 1	55	114	59	19	45	19	27	19	22	16	6	19
P4 - Day 2	36	50	68	64	31	19	48	16	52	48	39	26
P5	46	78	69	81	15	38	27	115	63	65	19	26
P6 - Day 1	20	47	58	71	30	6	43	26	46	59	15	7
P6 - Day 2	18	24	44	31	38	21	49	19	35	26	41	18
P7 - Day 1	22	26	49	20	25	15	48	18	30	9	51	8
P7 - Day 2	23	24	61	19	41	8	26	58	47	17	30	18
P8	31	14	17	10	50	9	37	4	14	8	32	23
P9 - Day 1	40	31	14	71	18	19	57	25	27	55	26	50
P9 - Day 2	57	42	31	38	5	14	31	30	17	28	23	19
P10	9	16	30	22	22	12	27	24	30	18	43	16
1-Day Mean	29	38	48	38	30	18	41	35	37	29	32	20

CV values marked green are >25% and ≤50%; yellow CVs are >50% and ≤100%; red CVs are >100%.

Table S7b: Coefficients of variation (CV values in %) for element concentrations of urine samples collected on two non-consecutive days for six study participants.

CV values (%)	Na	Mg	K	Ca	Co	Cu	Zn	As	Rb	Sr	Mo	Pb
P1 - Days 1+2	39	27	54	45	29	16	29	115	52	33	38	25
P2 - Days 1+2	11	41	34	38	31	21	62	21	25	28	53	18
P4 - Days 1+2	45	72	62	48	44	20	37	65	39	36	28	24
P6 - Days 1+2	26	35	48	50	33	15	43	58	38	43	28	13
P7 - D1+2	22	23	59	18	42	15	43	59	44	17	44	19
P9 - Days 1+2	98	46	52	68	15	16	78	81	43	49	95	37
2-Day Mean	40	41	52	45	32	17	49	67	40	34	48	23
2-Day/1-Day	1.4	1.1	1.1	1.2	1.1	0.9	1.2	1.9	1.1	1.2	1.5	1.2

CV values marked green are >25% and ≤50%; yellow CVs are >50% and ≤100%; red CVs are >100%.

Table S8. Z-scores for the first void samples collected from participants P1 to P10 on one or two days

z-score	Na	Mg	K	Ca	Co	Cu	Zn	As	Rb	Sr	Mo	Pb
P1 - Day 1	0.9	1.0	1.2	0.4	1.2	0.8	1.4	0.3	1.1	0.3	0.4	0.3
P1 - Day 2	0.3	1.0	0.7	0.4	0.9	0.2	0.2	1.4	0.7	0.7	1.5	0.6
P2 - Day 1	0.7	0.5	1.1	0.8	0.9	1.1	1.0	1.1	1.1	1.0	0.9	1.1
P2 - Day 2	1.0	1.1	1.1	1.0	1.2	1.2	1.1	1.1	1.2	1.1	1.1	1.1
P3	1.0	0.7	0.3	1.1	1.2	0.1	0.7	0.4	0.1	0.9	1.1	0.5
P4 - Day 1	1.1	1.2	0.8	0.7	1.2	0.6	0.9	0.6	0.6	1.0	0.3	1.5
P4 - Day 2	0.3	0.0	0.6	0.4	0.4	0.5	0.0	0.9	0.6	0.3	0.2	0.4
P5	2.6	0.5	11.1	0.3	0.0	0.0	0.7	0.0	9.1	0.7	0.4	0.0
P6 - Day 1	0.0	1.5	1.2	1.5	1.1	1.1	1.5	1.4	1.3	1.5	1.5	1.0
P6 - Day 2	0.6	0.8	0.9	0.6	1.4	1.1	0.6	1.4	0.7	0.5	0.3	0.3
P7 - Day 1	0.9	0.4	0.9	0.5	0.7	0.6	0.0	1.2	0.8	0.5	0.2	1.4
P7 - Day 2	1.9	0.7	1.5	1.7	1.5	1.3	4.8	2.1	1.0	0.3	1.5	2.7
P8	0.1	0.5	2.0	1.1	0.4	2.1	0.4	0.5	2.3	2.1	2.2	0.5
P9 - Day 1	0.8	1.1	0.4	0.9	0.3	0.7	0.3	0.0	0.0	1.0	1.5	0.2
P9 - Day 2	1.0	0.5	0.8	0.8	0.7	0.4	0.9	0.9	0.7	0.9	0.1	1.1
P10	1.4	1.7	1.1	1.3	0.6	0.3	0.8	1.5	1.0	1.6	0.3	0.3
Mean z-score	0.9	0.8	1.6	0.8	0.9	0.8	1.0	0.9	1.4	0.9	0.8	0.8

White: Z-score ≤ 0.5, green: z-score = 0.6-1.0, yellow: z-score = 1.1-2.0, red: z-score >2.

Table S9a. Mean urinary element concentrations of participant groups that differ in their smoking status.

Smoking status	n	Na µg/ml	Mg µg/ml	K µg/ml	Ca µg/ml	Co ng/ml	Cu ng/ml	Zn ng/ml	As ng/ml	Rb ng/ml	Sr ng/ml	Mo ng/ml	Pb ng/ml
Current	1	5318	161	6489	132	1.83	12.6	96	3.5	2821	229	95	0.96
Occasional	1	5535	112	5132	139	0.42	10.1	202	42.8	2052	183	65	0.97
Past	2	2830	104	3694.5	117	0.85	9.7	217	13.9	1963	145	33	0.61
Never	6	3378	98	3759	166	0.30	12.5	439	60.9	1732	159	55	0.65
Mean	10	3678	107	4156	150	0.57	11.7	337	43.9	1919	165	56	0.70

The mean group values are calculated from the mean values of n individuals in the respective group. n = number of participants.

Table S9b. Mean urinary element concentrations of participant groups that differ in their alcohol intake.

Alcohol intake	n	Na µg/ml	Mg µg/ml	K µg/ml	Ca µg/ml	Co ng/ml	Cu ng/ml	Zn ng/ml	As ng/ml	Rb ng/ml	Sr ng/ml	Mo ng/ml	Pb ng/ml
≥3 u/d	2	4839.5	123	5561	160	0.32	11.9	308	25.2	2154	211	64.5	0.87
1-2 u/d	2	2211.5	86.6	3201	67.0	0.87	12.6	409	15.7	1724	101	36.5	0.58
< 1 u/d	6	3780	108.4	4006	174	0.6	11.3	322	59.6	1906	172	59	0.69
Mean	10	3678	107	4156	149.8	0.57	11.7	337	43.9	1919	165	55.7	0.70

The mean group values are calculated from the mean values of n individuals in the respective group. n = number of participants, u/d = units*/day
*Units denote UK Alcohol units

Table S9c. Mean urinary element concentrations of participant groups that differ in their caffeine intake.

Caffeine intake	n	Na µg/ml	Mg µg/ml	K µg/ml	Ca µg/ml	Co ng/ml	Cu ng/ml	Zn ng/ml	As ng/ml	Rb ng/ml	Sr ng/ml	Mo ng/ml	Pb ng/ml
3+ d/d	5	3810	98.7	3809	118	0.80	12.3	382	24.2	1971	143	52.2	0.70
1-2 d/d	3	3715	121	4880	178	0.35	11.3	311	78.9	1886	194	57.0	0.82
Rarely	2	3293	106	3938	188	0.34	10.7	260	40.7	1836	178	62.5	0.53
Mean	10	3678	107	4156	150	0.57	11.7	337	43.9	1919	165	55.7	0.70

The mean group values are calculated from the mean values of n individuals in the respective group. n = number of participants, d/d = drinks*/day
*Caffeine drinks include coffee, tea and caffeinated soft drinks.

Table S10. Data to evaluate possible relationships of urinary element concentrations with gender.

	Gender	Na µg/ml	Mg µg/ml	K µg/ml	Ca µg/ml	Co ng/ml	Cu ng/ml	Zn ng/ml	As ng/ml	Rb ng/ml	Sr ng/ml	Mo ng/ml	Pb ng/ml
Mean	female	3606	114	4539	141	0.76	10.7	259	64.6	2088	147	56.9	0.72
Median	female	3357	111	4270	158	0.44	10.4	221	36.4	2072	152	46.5	0.68
SD	female	1469	28	1031	77	0.63	1.4	158	65.7	383	59	29.3	0.22
CV (%)	female	41	25	23	55	83	14	61	102	18	40	52	30
Male	male	3512	85	3255	157	0.18	12.5	458	7.3	1616	181	47.8	0.61
Median	male	3540	88	2915	162	0.18	14.1	383	5.6	1603	184	52.4	0.60
SD	male	1677	33	1562	57	0.05	3.0	264	5.2	492	61	27.4	0.09
CV (%)	male	48	39	48	36	27	24	58	71	30	34	57	15
Mean/Mean	male/fem	1.0	0.7	0.7	1.1	0.2	1.2	1.8	0.1	0.8	1.2	0.8	0.8
Median/Median	male/fem	1.1	0.8	0.7	1.0	0.4	1.4	1.7	0.2	0.8	1.2	1.1	0.9
P	male vs. fem	0.91	0.09	0.07	0.67	0.04	0.11	0.08	0.05	0.05	0.29	0.55	0.26

Results that may be indicative of significant differences between genders are highlighted in red.

Table S11: Data to evaluate possible relationships of urinary element concentrations with diet groups.

	Diet group	Na µg/ml	Mg µg/ml	K µg/ml	Ca µg/ml	Co ng/ml	Cu ng/ml	Zn ng/ml	As ng/ml	Rb ng/ml	Sr ng/ml	Mo ng/ml	Pb ng/ml
Mean	omv	3372	88.4	3370	169	0.26	11.62	427	40.3	1737	161	51.3	0.59
Median	omv	3387	85.7	3310	163	0.19	11.28	352	10.8	1888	157	40.5	0.55
SD	omv	1344	30.4	1180	54	0.17	2.74	241	57.6	445	49	32.0	0.13
CV (%)	omv	40	34	35	32	67	24	56	143	26	30	62	22
Mean	no-m	4400	127.4	5252	161	0.66	11.30	246	56.6	2107	199	66.2	0.88
Median	no-m	5318	134.5	5489	180	0.41	11.13	233	36.5	2181	217	64.3	0.85
SD	no-m	1742	29.4	1158	46	0.66	1.88	124	75.1	534	42	21.2	0.15
CV (%)	no-m	40	23	22	28	101	17	50	133	25	21	32	17
Mean/Mean-omv	no-m	1.3	1.4	1.6	1.0	2.5	1.0	0.6	1.4	1.2	1.2	1.3	1.5
Median/Median-omv	no-m	1.6	1.6	1.7	1.1	2.2	1.0	0.7	3.4	1.2	1.4	1.6	1.6
P (vs. omv)	no-m	0.24	0.04	0.01	0.79	0.10	0.82	0.15	0.66	0.19	0.17	0.37	0.003
Mean	no-d	3369	127.3	4941	55	1.65	11.14	122	15.8	2409	115	52.7	0.72
Median	no-d	2820	111.0	4323	21	1.66	10.51	131	11.4	2235	70	33.0	0.62
SD	no-d	1740	29.3	1350	67	0.19	1.23	22	15.0	358	99	36.7	0.21
CV (%)	no-d	52	23	27	121	11	11	18	95	15	86	70	29
Mean/Mean-omv	no-d	1.0	1.4	1.5	0.3	6.4	1.0	0.3	0.4	1.4	0.7	1.0	1.2
Median/Median-omv	no-d	0.8	1.3	1.3	0.1	8.8	0.9	0.4	1.1	1.2	0.4	0.8	1.1
P (vs. omv)	no-d	1.00	0.08	0.08	0.01	3.1E-07	0.78	0.06	0.50	0.04	0.30	0.95	0.20

Results that may be indicative of significant differences between diet groups are highlighted in red.
omv = omnivore, no-m = no meat, no-d = no dairy.

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Supplementary Information (Part II) to:

Determination of major and trace element variability in healthy human urine by ICP-QMS and specific gravity normalisation

By Moore RET · Rehkämper M · Kreissig K · Strekopytov S · Larner F

Specific gravity-normalised urine concentrations for all samples from each participant.

	Na	Mg	K	Ca	Co	Cu	Zn	As	Rb	Sr	Mo	Pb
	mg/ml	µg/ml	mg/ml	µg/ml	ng/ml	ng/ml	ng/ml	ng/ml	µg/ml	ng/ml	ng/ml	ng/ml
P1 Day 1	4.75	126	2.22	181	0.3	10.7	657	10.2	1.46	149	25.3	0.56
	2.72	92	6.11	150	0.2	11	484	10.4	3.51	129	51.6	0.7
	4.59	119	4.89	264	0.17	7.1	397	8.6	2.47	190	27	0.56
	3.62	109	3.64	207	<0.08	8	395	14.1	2.16	160	20.7	0.53
P1 Day 2	3.19	119	1.52	301	0.21	9.5	604	271.2	0.92	256	16.5	0.96
	3.07	45	6.49	91	0.17	9.6	517	156.5	3.88	101	24.8	0.72
	0.71	79	2.68	167	0.19	10.2	808	118	1.96	163	27.4	0.82
	4.16	100	1.68	400	0.1	7.7	377	71.1	0.79	267	25.4	1.01
P2 Day 1	5.15	137	2.65	73	0.57	13	340	55	1.4	105	118.2	0.99
	5.23	134	5.09	86	0.37	10	238	47.1	2.01	147	85.8	1.15
	5.75	152	6.58	133	0.49	10.4	121	45.2	2.36	192	31	1.17
P2 Day 2	4.85	25	3.41	205	0.52	11.7	349	44.8	1.47	251	75.3	1.01
	5.63	119	6.74	182	0.28	7.8	96	35.1	2.55	212	46.5	0.75
	6.6	105	6.31	152	0.27	7.7	66	29.4	2.53	189	31.8	0.78
P3 Day 1	1.27	99	2.68	122	0.66	9.6	235	118.2	1.26	121	57.4	0.86
	1.23	84	2.71	122	0.49	16.7	286	69.2	1.32	115	52.5	0.86
	1.61	127	8.43	262	<0.08	7.2	187	58.4	2.56	164	20.6	<0.03
	1.69	147	1.49	281	<0.08	9.3	509	169.6	0.64	197	38	<0.03
	1.54	129	2.29	280	0.51	7.4	373	517.3	0.97	201	40.4	0.99
P4 Day 1	1.41	176	2.97	132	0.57	12.6	290	138	1.71	139	88.9	0.54
	2.78	118	4.33	126	0.41	13.6	253	150	2.34	129	93.2	0.4
	4.47	6	4.49	159	<0.08	9.4	145	97.2	1.5	118	95.4	<0.03
	6.13	2	10.23	191	0.36	9.4	245	113.7	2.34	94	84	0.37
P4 Day 2	3.36	146	2.36	125	0.75	14.8	204	41.7	1.29	110	87.7	0.55
	4.64	115	5.19	111	0.51	15	236	38.4	2.23	92	73.6	0.47
	2.89	76	8.06	113	0.4	9.1	44	27	3.45	98	48	0.41
	1.86	124	3	116	0.88	13.5	249	34.9	1.89	101	124.7	0.37
	2.33	267	1.25	351	0.82	14.6	312	39.8	0.8	236	136.2	0.7
P5 Day 1	4.4	134	3.74	42	1.71	9.7	91	6.2	1.63	91	114.5	0.74
	4.28	170	4.5	66	1.63	10.9	73	7.7	2.21	135	106	0.78
	8.93	323	13.18	282	2.24	19.7	101	<0.5	5.47	418	79.1	<0.03
	3.66	18	4.53	139	1.74	10	125	10.3	1.97	273	80.6	1.07
P6 Day 1	1.96	189	1.26	27	1.93	11	215	44.7	0.91	87	40.1	0.63

	2.51	87	6.74	10	0.89	10.2	103	31.2	3.11	37	31.6	0.54
	1.79	90	5.99	9	1.36	10.6	94	29.1	3	34	29	0.61
	1.62	79	3.3	7	1.65	9.6	111	24.8	1.92	27	31.4	0.59
P6 Day 2	2.54	132	2.46	17	2.55	13.1	177	14.5	1.65	61	26.9	0.58
	3.37	111	2.95	28	1.67	11.7	209	11.6	1.59	90	28.7	0.77
	3.09	72	6.37	14	1.16	8.7	66	9.8	3.24	50	17.5	0.5
	2.28	124	4.26	24	1.28	8.6	97	9.9	2.2	81	47.2	0.61
P7 Day 1	2.49	110	1.4	185	0.13	8.5	359	10.7	1.06	215	20.7	0.47
	3.21	100	4.27	228	<0.08	8.9	585	7.3	2.03	199	36.1	0.57
	2.73	127	2.39	251	0.12	7.6	262	9.4	1.31	227	27.2	0.54
	4.02	66	2.02	162	0.12	6.3	202	7.7	1.22	186	8.1	0.54
P7 Day 2	2.65	97	1.55	180	0.17	10.6	438	3.9	1.23	227	22.8	0.53
	4.14	81	4.92	251	<0.08	9.6	306	<0.5	2.16	238	41.6	0.85
	4.34	72	7.25	212	<0.08	10.1	160	3.4	3.49	219	35.1	0.62
	3.01	132	2.94	285	<0.08	10	279	4.9	1.64	324	52.5	0.66
	2.81	101	2.26	200	0.17	8.5	246	3.7	1.36	248	50.6	0.6
P8 Day 1	4.28	65	1.85	98	0.24	12.8	580	3.7	1.23	104	48.6	0.51
	4.52	70	2.71	109	0.18	15.4	653	3.8	1.69	121	95.4	0.58
	7.02	54	2.75	117	<0.08	15	338	3.9	1.52	103	67.6	0.86
	8.02	53	2.68	93	0.43	15.4	301	3.6	1.34	108	53.8	0.68
P9 Day 1	0.41	65	1.6	76	0.18	16	1498	4.3	1.03	112	15.3	0.73
	0.66	93	1.52	164	0.18	18	1329	4.4	1.03	203	10.8	0.67
	0.92	107	1.46	276	0.18	13.8	788	4	0.82	265	9.8	0.65
	1.13	54	1.15	54	<0.08	11.3	274	2.4	0.54	67	8.7	<0.03
P9 Day 2	1.56	49	2.51	58	0.18	15.2	376	21.5	1.56	89	82.9	0.42
	5.76	50	4.44	120	<0.08	16.1	317	17.9	2.1	154	61.8	0.62
	3.76	21	2.98	74	0.2	12.2	198	11.3	1.62	111	99.5	0.55
P10 Day 1	3.66	170	3.95	233	0.24	14.2	500	10.1	1.57	306	55.5	0.72
	4.09	116	7.56	160	0.21	12.5	322	6.5	2.76	200	40.1	0.69
	4.35	122	8.04	164	0.23	13.6	327	7.1	3.19	230	45.6	0.73
	4.02	132	4.43	136	0.25	12.1	353	8.2	1.88	211	71.3	0.67
	4.61	132	5.97	214	<0.08	16.2	566	5.5	1.88	251	109.1	0.97