Electronic Supplementary Material (ESI) for Analytical Methods.

Supplementary Material

Analysis of urine by MIP-OES: challenges and strategies to correct matrix effects

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Table S1. Slopes obtained in 0.14 mol L^{-1} HNO_3 and urine media (2-fold diluted) by MIP-OES without and with IS.

Analyte - Emission line (nm)	Matrix	Without IS		With selected IS		
		Slope ± SD	*r*	IS	Slope ± SD	*r*
Al 396.152 (I)	Aqueous	18307 ± 145	0.9997	Ga	2.23 ± 0.03	0.9988
	Urine	27668 ± 307	0.9994		2.21 ± 0.01	0.9998
As 228.812 (I)	Aqueous	9153 ± 72	0.9997	OH	0.280 ± 0.004	0.9988
	Urine	6859 ± 22	0.9999		0.278 ± 0.003	0.9995
Ba 455.403 (II)	Aqueous	232443 ± 2307	0.9995	OH	7.1 ± 0.1	0.9991
	Urine	161222 ± 443	0.9999		6.53 ± 0.05	0.9997
Be 234.861 (I)	Aqueous	155800 ± 1217	0.9997	OH	4.77 ± 0.02	0.9999
	Urine	110298 ± 741	0.9998		4.47 ± 0.02	0.9999
Bi 472.255 (I)	Aqueous	92 ± 1	0.9994	Rh	$0.0087 \pm 1x10^{-4}$	0.9986
	Urine	120 ± 2	0.9989		$0.00883 \pm 9x10^{-5}$	0.9995
Cd 228.802 (I)	Aqueous	10197 ± 66	0.9998	OH	0.312 ± 0.003	0.9995
	Urine	6001 ± 23	0.9999		0.243 ± 0.003	0.9994
Co 240.725 (I)	Aqueous	3518 ± 56	0.9987	-	-	-
	Urine	3569 ± 69	0.9981		-	-
Cr 357.820 (I)	Aqueous	23635 ± 203	0.9996	Rh	6.21 ± 0.05	0.9997
	Urine	36746 ± 365	0.9995		6.13 ± 0.04	0.9998
Cu 324.754 (I)	Aqueous	81413 ± 868	0.9994	-	-	-
	Urine	73912 ± 299	0.9999		-	-
Li 670.784 (I)	Aqueous	343393 ± 2105	0.9998	Rh	90.2 ± 0.7	0.9997
	Urine	509191 ± 5430	0.9994		84.9 ± 0.5	0.9998
Pb 363.957 (I)	Aqueous	491 ± 3	0.9998	Ga	$0.0598 \pm 7x10^{-4}$	0.9993
	Urine	727 ± 5	0.9997		$0.0581 \pm 7x10^{-4}$	0.9997
Sb 217.581 (I)	Aqueous	933 ± 22	0.9973	-	-	-
	Urine	614 ± 15	0.9971		-	-

Lines: I – atomic line; II ionic line

Table S2. Recoveries and relative standard deviations (%) for Al, As, Ba, Be, Bi, Cd, Co, Cr, Cu, Li, Pb and Sb in 2-fold diluted urine determined by MIP-OES without and with IS (mean and standard deviation, n = 3).

Level	Recovery (RSD) (%)									
(mg L^{-1})	Al 396.152 nm		As 228.812 nm		Ba 455.403 nm		Be 234.861 nm		Bi 472.255 nm	
	Without IS	With Ga	Without IS	With OH	Without IS	With OH	Without IS	With OH	Without IS	With Rh
0.2	149 (8)	120 (7)	77.5 (0.6)	105 (2)	57.4 (0.4)	83.3 (0.7)	69 (1)	99 (1)	< LOQ*	< LOQ*
0.4	144 (1)	105 (2)	77 (1)	100 (2)	60.9 (0.3)	84.1 (0.6)	72.0 (0.6)	97 (1)	118 (5)	< LOQ*
0.6	156 (3)	108 (1)	78 (1)	101 (1)	65.8 (0.4)	88.4 (0.7)	74.2 (0.5)	98.1 (0.5)	132 (11)	< LOQ*
1.0	156 (3)	105 (2)	75.8 (0.7)	98 (1)	67.3 (0.8)	89 (1)	72.7 (0.7)	95.1 (0.8)	137 (2)	105 (2)
2.0	155 (4)	100 (2)	75.0 (0.5)	97.8 (0.9)	68.0 (0.1)	89.4 (0.3)	71.2 (0.5)	93.3 (0.2)	132 (5)	101 (4)
3.0	150 (6)	100 (2)	75.4 (0.6)	100 (1)	68.4 (0.5)	91.6 (0.9)	70.7 (0.5)	94 (1)	128 (3)	101 (2)

Level	Recovery (RSD) (%)									
(mg L^{-1})	Cd 228.802 nm		Co 240.725 nm		Cr 357.820 nm		Cu 324.754 nm		Li 670.784 nm	
	Without IS	With OH	Without IS	With IS	Without IS	With Rh	Without IS	With IS	Without IS	With Rh
0.2	50.8 (0.6)	75.9 (0.4)	95 (3)	-	140 (2)	106 (6)	96 (1)	-	139 (8)	106.0 (0.3)
0.4	54.7 (0.1)	75.0 (0.3)	106.0 (0.9)	-	145 (3)	99 (3)	91.5 (0.2)	-	140 (3)	96 (3)
0.6	57.8 (0.5)	77 (1)	109.6 (0.5)	-	160 (4)	108 (5)	93.6 (0.9)	-	151.2 (0.9)	102 (2)
1.0	57 (2)	75 (2)	110 (1)	-	158 (3)	102 (2)	93 (1)	-	151 (4)	98 (3)
2.0	57.9 (0.8)	76.0 (0.8)	105.3 (0.3)	-	158 (5)	100 (2)	91.0 (0.8)	-	152 (7)	96 (3)
3.0	59 (1)	78 (2)	100 (1)	-	154 (5)	99.3 (0.8)	90.9 (0.7)	-	147 (6)	95 (2)

Level	Recovery (RSD) (%)			
(mg L^{-1})	Pb 363.957 nm		Sb 217.851 nm	
	Without IS	With Ga	Without IS	With IS
0.2	123 (9)	94 (10)	23 (10)	-
0.4	146 (3)	103 (3)	25 (4)	-
0.6	146 (6)	99 (4)	37 (7)	-
1.0	149 (3)	99.0 (0.3)	49 (2)	-
2.0	149 (2)	96 (2)	58 (1)	-
3.0	147 (4)	97 (1)	61.6 (0.3)	-

*The LOD values are shown in Table 3

Table S3. Slopes obtained in 0.14 mol L^{-1} HNO_3 and urine media (20-fold diluted) by MIP-OES without and with IS.

Analyte - Emission line (nm)	Matrix	Without IS		With selected IS		
		Slope ± SD	*r*	IS	Slope ± SD	*r*
Al 396.152 (I)	Aqueous	7011 ± 200	0.9959	-	-	-
	Urine	8362 ± 89	0.9994		-	-
As 228.812 (I)	Aqueous	6422 ± 100	0.9988	-	-	-
	Urine	7449 ± 52	0.9998		-	-
Ba 455.403 (II)	Aqueous	127890 ± 4081	0.9949	Rh	21.9 ± 0.3	0.9993
	Urine	148186 ± 974	0.9998		20.7 ± 0.2	0.9997
Be 234.861 (I)	Aqueous	104766 ± 2197	0.9978	Rh	53 ± 2	0.9908
	Urine	133538 ± 955	0.9997		55.0 ± 0.4	0.9997
Bi 472.255 (I)	Aqueous	48 ± 2	0.9970	Sc	0.0084 ± 0.0001	0.9984
	Urine	70 ± 2	0.9974		0.0089 ± 0.0002	0.9978
Ca 396.847 (II)	Aqueous	89349 ± 1956	0.9976	N_2^+	2.71 ± 0.09	0.9948
	Urine	103552 ± 1757	0.9986		3.13 ± 0.07	0.9978
Cd 228.802 (I)	Aqueous	6894 ± 169	0.9970	-	-	-
	Urine	8200 ± 62	0.9997		-	-
Co 240.725 (I)	Aqueous	1740 ± 48	0.9961	Sc	0.30 ± 0.01	0.9914
	Urine	2428 ± 30	0.9993		0.311 ± 0.004	0.9993
Cr 357.820 (I)	Aqueous	9024 ± 392	0.9907	Sc	1.58 ± 0.04	0.9970
	Urine	11464 ± 66	0.9998		1.47 ± 0.01	0.9999
Cu 324.754 (I)	Aqueous	37701 ± 1365	0.9935	Rh	6.5 ± 0.1	0.9987
	Urine	46277 ± 410	0.9996		6.47 ± 0.06	0.9995
Li 670.784 (I)	Aqueous	155220 ± 4327	0.9961	N_2^+	4.7 ± 0.2	0.9934
	Urine	193700 ± 1292	0.9998		4.79 ± 0.04	0.9997
Mg 383.829 (I)	Aqueous	1283 ± 59	0.9894	Sc	0.22 ± 0.01	0.9970
	Urine	1661 ± 37	0,9975		0.213 ± 0.005	0.9978
Mg 280.271 (II)	Aqueous	26754 ± 568	0.9978	Y	1.51 ± 0.03	0.9986
	Urine	33663 ± 733	0.9976		1.49 ± 0.03	0.9973
Pb 363.957 (I)	Aqueous	214 ± 13	0.9814	Sc	0.0372 ± 0.0004	0.9995
	Urine	309 ± 4	0.9991		0.0396 ± 0.0005	0.9993
Sb 217.581 (I)	Aqueous	380 ± 11	0.9955	-	-	-
	Urine	431 ± 9	0.9980		-	-

Lines: I – atomic line; II ionic line

Table S4. Slopes obtained in 0.14 mol L^{-1} HNO_3 and urine media (200-fold diluted) by MIP-OES without and with IS.

Analyte - Emission line (nm)	Matrix	Without IS		With selected IS		
		Slope ± SD	*r*	IS	Slope ± SD	*r*
Al 396.152 (I)	Aqueous	15958 ± 511	0.9959	N_2^+	$6x10^8 \pm 4x10^7$	0.9961
	Urine	14204 ± 83	0.9998		$5x10^8 \pm 5x10^6$	0.9997
As 228.812 (I)	Aqueous	10315 ± 119	0.9993	-	-	-
	Urine	10058 ± 42	0.9999		-	-
Ba 455.403 (II)	Aqueous	222363 ± 2682	0.9993	-	-	-
	Urine	210915 ± 886	0.9999		-	-
Be 234.861 (I)	Aqueous	174695 ± 2546	0.9989	-	-	-
	Urine	172114 ± 1358	0.9997		-	-
Bi 472.255 (I)	Aqueous	116 ± 3	0.9968	-	-	-
	Urine	105 ± 1	0.9992		-	-
Ca 396.847 (II)	Aqueous	141751 ± 2034	0.9990	-	-	-
	Urine	130571 ± 1605	0.9992		-	-
Cd 228.802 (I)	Aqueous	10428 ± 193	0.9983	-	-	-
	Urine	10180 ± 71	0.9998		-	-
Co 240.725 (I)	Aqueous	3669 ± 95	0.9967	-	-	-
	Urine	3533 ± 25	0.9998		-	-
Cr 357.820 (I)	Aqueous	26676 ± 1751	0.9789	N_2^+	$9x10^8 \pm 5x10^7$	0.9826
	Urine	22317 ± 121	0.9999		$9x10^8 \pm 9x10^6$	0.9994
Cu 324.754 (I)	Aqueous	80269 ± 1521	0.9982	N_2^+	$3x10^9 \pm 4x10^7$	0.9991
	Urine	74700 ± 580	0.9997		$3x10^9 \pm 3x10^7$	0.9993
Li 670.784 (I)	Aqueous	265088 ± 6520	0.9970	-	-	-
	Urine	245305± 1036	0.9999		-	-
Mg 383.829 (I)	Aqueous	2765 ± 103	0,9931	N_2^+	$9x10^7 \pm 3x10^6$	0.9949
	Urine	2435 ± 17	0,9997		$9x10^7 \pm 1x10^6$	0.9991
Mg 280.271 (II)	Aqueous	39698 ± 573	0.9990	-	-	-
	Urine	39945 ± 287	0.9997		-	-
Pb 363.957 (I)	Aqueous	586 ± 22	0.9930	N_2^+	$2x10^7 \pm 6x10^5$	0.9944
	Urine	534 ± 7	0.9992		$2x10^7 \pm 4x10^5$	0.9984
Sb 217.581 (I)	Aqueous	657 ± 10	0.9989	-	-	-
	Urine	629 ± 7	0.9994		-	-

Lines: I – atomic line; II ionic line

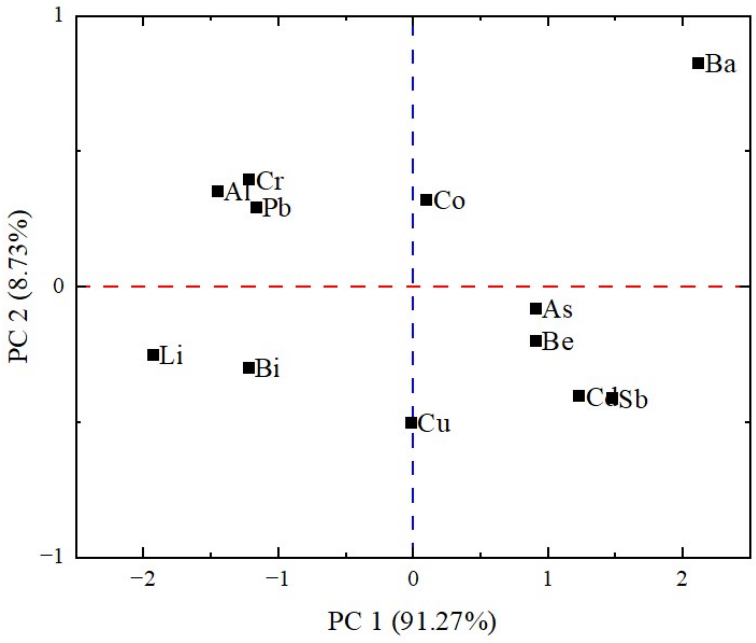

Figure S1. PCA representation for each analytes in urine matrix.

Table S5. Elements, emission lines, and energy values.

	Element	Emission line (nm)	E_{exc} (eV)	E_{ion} (eV)	E_{sum}† (eV)
Ionic lines	Ba	455.403	2.72	5.21	7.93
	Ca	396.847	3.12	6.11	9.23
	Mg	280.271	4.42	7.65	12.07
Atomic lines	Al	396.152	3.13	-	3.13
	As	228.812	5.42	-	5.42
	Be	234.861	5.28	-	5.28
	Bi	472.255	2.63	-	2.63
	Cd	228.802	5.42	-	5.42
	Co	240.725	5.15	-	5.15
	Cr	357.820	3.46	-	3.46
	Cu	324.754	3.82	-	3.82
	Li	670.784	1.85	-	1.85
	Mg	383.829	3.23	-	3.23
	Pb	363.957	3.40	-	3.40
	Sb	217.581	5.70	-	5.70

†$E_{sum} = E_{excitation} + E_{ionization}$

Table S6. Recoveries and relative standard deviations (%) for Al, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Li, Mg, Pb and Sb in 20-fold diluted urine determined by MIP-OES with and without IS (mean and standard deviation, n = 3).

Level	Recovery (RSD) (%)									
(mg L^{-1})	Al 396.152 nm		As 228.812 nm		Ba 455.403 nm		Be 234.861 nm		Bi 472.255 nm	
	Without IS	With IS	Without IS	With IS	Without IS	With Rh	Without IS	With Rh	Without IS	With Sc
0.2	82 (1)	-	90.8 (0.3)	-	73.3 (0.8)	82 (1)	89 (2)	100 (2)	<LOQ*	<LOQ*
0.4	100 (1)	-	106 (2)	-	93 (1)	89 (2)	109 (6)	101 (6)	<LOQ*	117 (10)
0.6	107 (1)	-	112 (2)	-	101 (4)	94 (3)	111 (3)	97 (5)	117 (3)	101 (5)
1.0	112 (1)	-	115 (1)	-	108 (1)	93 (1)	120 (2)	96 (1)	132 (5)	104 (1)
2.0	112 (6)	-	112.4 (0.4)	-	110 (4)	92 (1)	121 (5)	93 (2)	142 (10)	108 (2)
3.0	118 (2)	-	115.2 (0.9)	-	113.7 (0.6)	94 (2)	126 (2)	96 (2)	144 (2)	108 (2)

Level	Recovery (RSD) (%)									
(mg L^{-1})	Ca 396.847 nm		Cd 228.802 nm		Co 240.725 nm		Cr 357.820 nm		Cu 324.750 nm	
	Without IS	With N_2^+	Without IS	With IS	Without IS	With Sc	Without IS	With Sc	Without IS	With Rh
0.2	<LOQ*	<LOQ*	91 (1)	-	72 (5)	91 (5)	79 (3)	94 (2)	81 (3)	88 (3)
0.4	<LOQ*	<LOQ*	108 (1)	-	105 (8)	95 (3)	103 (3)	94 (3)	102 (2)	97 (3)
0.6	<LOQ*	<LOQ*	112 (1)	-	110 (4)	95 (1)	109.7 (0.8)	95 (2)	107.1 (0.5)	99 (2)
1.0	121(2)	94 (1)	117 (2)	-	122 (2)	96 (1)	119 (1)	95 (3)	114 (2)	98 (1)
2.0	113 (4)	93(2)	114 (5)	-	131 (7)	100.3 (0.4)	121 (7)	92.5 (0.7)	116 (6)	97 (3)
3.0	117 (2)	94 (3)	117.9 (0.6)	-	136.3 (0.6)	102 (2)	124.5 (0.9)	94 (2)	121 (1)	100 (2)

Level (mg L^{-1})	Recovery (RSD) (%)									
	Li 670.784 nm		Mg 383.829		Mg 280.271 nm		Pb 363.957 nm		Sb 217.851 nm	
	Without IS	With N_2^+	Without IS	With Sc	Without IS	With Y	Without IS	With Sc	Without IS	With IS
0.2	108 (2)	90 (2)	<LOQ*	<LOQ*	<LOQ*	<LOQ*	108 (2)	114 (5)	<LOQ*	-
0.4	115 (4)	97 (6)	<LOQ*	116 (4)	<LOQ*	117 (7)	106 (6)	96 (7)	95 (7)	-
0.6	118 (3)	95 (3)	<LOQ*	103 (8)	<LOQ*	120 (3)	111 (8)	96 (4)	114 (5)	-
1.0	121.3 (0.9)	95 (1)	127 (7)	101 (5)	133 (5)	108 (3)	130 (4)	102.5 (0.7)	117 (1)	-
2.0	121 (4)	100 (4)	123 (8)	94 (9)	123 (1)	98 (7)	136 (7)	104.3 (0.3)	109 (4)	-
3.0	124 (1)	100 (2)	131 (1)	99 (3)	128 (2)	101 (2)	141(4)	106 (1)	111(1)	-

*The LOD values are shown in Table 3

Table S7. Recoveries and relative standard deviations (%) for Al, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Li, Mg, Pb, and Sb in 200-fold diluted urine determined by MIP-OES with and without IS (mean and standard deviation, n = 3).

Level	Recovery (RSD) (%)									
(mg L^{-1})	Al 396.152 nm		As 228.812 nm		Ba 455.403 nm		Be 234.861 nm		Bi 472.255 nm	
	Without IS	With N_2^+	Without IS	With IS	Without IS	With IS	Without IS	With IS	Without IS	With IS
0.2	57 (2)	101 (1)	111 (2)	-	81 (1)	-	108 (1)	-	<LOQ*	-
0.4	76 (5)	90 (4)	103 (2)	-	90 (3)	-	107 (4)	-	<LOQ*	-
0.6	78 (3)	84 (2)	101 (2)	-	89 (1)	-	103 (3)	-	99 (4)	-
1.0	85 (2)	85.1 (0.5)	101 (2)	-	94 (2)	-	104 (1)	-	99 (4)	-
2.0	86 (2)	83 (3)	98 (3)	-	92 (1)	-	99 (3)	-	92 (1)	-
3.0	87 (2)	84 (1)	99 (2)	-	93.9 (0.7)	-	99 (2)	-	92 (2)	-

Level	Recovery (RSD) (%)									
(mg L^{-1})	Ca 396.847 nm		Cd 228.802 nm		Co 240.725 nm		Cr 357.820 nm		Cu 324.750 nm	
	Without IS	With IS	Without IS	With IS	Without IS	With IS	Without IS	With N_2^+	Without IS	With N_2^+
0.2	< LOQ*	-	94.8 (0.6)	-	92 (3)	-	55 (2)	75 (2)	73 (1)	93.4 (0.5)
0.4	105 (3)	-	96 (2)	-	97.8 (0.3)	-	71 (3)	85 (6)	85 (5)	97 (6)
0.6	95 (3)	-	95.3 (0.5)	-	95 (2)	-	74 (3)	85 (2)	86 (2)	97 (1)
1.0	102 (6)	-	101 (1)	-	100 (2)	-	79 (2)	92 (3)	93 (2)	106 (1)
2.0	95 (3)	-	97 (2)	-	96 (1)	-	80.3 (0.4)	94 (2)	90 (2)	105 (5)
3.0	94 (1)	-	97.5 (0.8)	-	96.7 (0.9)	-	81.8 (0.5)	97.9 (0.8)	92 (2)	110 (1)

Level (mg L^{-1})	Recovery (RSD) (%)									
	Li 670.784 nm		Mg 383.829		Mg 280.271 nm		Pb 363.957 nm		Sb 217.851 nm	
	Without IS	With IS	Without IS	With N_2^+	Without IS	With IS	Without IS	With N_2^+	Without IS	With IS
0.2	106 (1)	-	76 (2)	95 (2)	120 (2)	-	68 (7)	88 (8)	99 (2)	-
0.4	101 (3)	-	85 (6)	97 (8)	108 (2)	-	94 (8)	106 (9)	99 (7)	-
0.6	97 (4)	-	83 (3)	94 (2)	102 (3)	-	86 (7)	97 (7)	102 (2)	-
1.0	98 (2)	-	87 (2)	100 (1)	103 (1)	-	88 (4)	101 (5)	101.2 (0.4)	-
2.0	94 (1)	-	86 (2)	100 (4)	101 (1)	-	87.3 (0.3)	102 (3)	96 (4)	-
3.0	94 (2)	-	88 (2)	104 (2)	102 (1)	-	91 (2)	108 (2)	96 (2)	-

*The LOD values are shown in Table 3

Table S8. Internal standards and chosen internal standard for Al, As, Ba, Be, Bi, Cd, Co, Cr, Cu, Li, Pb, and Sb determination in urine sample (2-fold diluted) by MIP-OES.

Analyte - emission line (nm)	E sum‡ (eV)	Internal standards	Internal standard selected - emission line (nm)	E sum‡ (eV)
Al 396.152 (I)	3.13	Ga, Rh and Sc I	Ga 417.204 (I)	2.97
As 228.812 (I)	5.42	CN ¤, N_2^+ ¤, OH, Sc II and Y	OH	4.01
Ba 455.403 (II)	7.93	OH	OH	4.01
Be 234.861 (I)	5.28	CN ¤, OH, Sc II and Y	OH	4.01
Bi 472.255 (I)	2.63	CN, Ga, OH ¤, Pd and Rh	Rh 343.489 (I)	3.61
Cd 228.802 (I)	5.42	OH	OH	4.01
Co 240.725 (I)	5.15	-	-	-
Cr 357.820 (I)	3.46	Ga, Rh and Sc I	Rh 365.799 (I)	3.39
Cu 324.75 (I)	3.82	-	-	-
Li 670.784 (I)	1.85	Ga, OH ¤, Pd, Rh and Sc I	Rh 365.799 (I)	3.39
Pb 363.957 (I)	3.40	Ga, OH ¤, Pd and Rh	Ga 417.204 (I)	2.97
Sb 217.581 (I)	5.70	None corrects	-	-

Lines: I – atomic line; II ionic line

‡E sum= E ionization + excitation

¤ A x M treatment

Table S9. Internal standards and chosen internal standard for Al, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Li, Mg, Pb, and Sb determination in urine sample (20-fold diluted) by MIP-OES.

Analyte – emission line (nm)	E sum‡ (eV)	Internal standards	Internal standard selected - emission line (nm)	E sum‡ (eV)
Al 396.152 (I)	3.13	-	-	-
As 228.812 (I)	5.42	-	-	-
Ba 455.403 (II)	7.93	Ge, N_2, Rh and Sc I	Rh 343.489 (I)	3.61
Be 234.861 (I)	5.28	CN, Ga, Ge, Pd, Rh, Sc and Y	Rh 365.799 (I)	3.39
Bi 472.255 (I)	2.63	Ga, Ge, N_2^+, Rh, Sc I and Y	Sc 391.182 (I)	3.17
Ca 396.847 (II)	9.23	CN, Ga, Ge, N_2^+, OH ¤, Pd, Rh, Sc and Y	N_2^+	3.17
Cd 228.802 (I)	5.42	-	-	-
Co 240.725 (I)	5.15	Ge, Rh, and Sc I	Sc 391.182 (I)	3.17
Cr 357.820 (I)	3.46	Ga, Ge, Rh and Sc I	Sc 391.182 (I)	3.17
Cu 324.750 (I)	3.82	Ga, Ge, Rh and Sc	Rh 343.489 (I)	3.61
Li 670.784 (I)	1.85	CN, Ga, Ge, N_2 ¤, N_2^+, OH ¤, Pd, Rh, Sc and Y	N_2^+	3.17
Mg 383.829 (I)	3.23	Ga, Ge, N_2^+, OH ¤, Rh, Sc and Y	Sc 391.182 (I)	3.17
Mg 280.271 (II)	12.07	Ga, Ge, N_2^+, OH ¤, Rh, Sc and Y	Y 371.029 (II)	9.56
Pb 363.957 (I)	3.40	Ga, Ge, N_2^+, Rh, Sc and Y	Sc 391.182 (I)	3.17
Sb 217.581 (I)	5.70	-	-	-

Lines: I – atomic line; II ionic line

‡E sum= E ionization + excitation

¤ A x M treatment

Table S10. Internal standards and chosen internal standard for Al, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Li, Mg, Pb and Sb determination in urine sample (200-fold diluted) by MIP-OES

Analyte - emission line (nm)	E sum‡ (eV)	Internal standards	Internal standard selected - emission lineh (nm)	E sum‡ (eV)
Al 396.152 (I)	3.13	N_2^+¤ and Pd	N_2^+	3.17
As 228.812 (I)	5.42	-	-	-
Ba 455.403 (II)	7.93	-	-	-
Be 234.861 (I)	5.28	-	-	-
Bi 472.255 (I)	2.63	-	-	-
Ca 396.847 (II)	9.23	-	-	-
Cd 228.802 (I)	5.42	-	-	-
Co 240.725 (I)	5.15	-	-	-
Cr 357.820 (I)	3.46	N_2^+¤ and Pd	N_2^+	-
Cu 324.75 (I)	3.82	N_2^+¤	N_2^+	3.17
Li 670.784 (I)	1.85	-	-	-
Mg 383.829 (I)	3.23	N_2^+¤, Pd, Rh and Sc	N_2^+	3.17
Mg 280.271 (II)	12.07	-	-	-
Pb 363.957 (I)	3.40	N_2^+¤	N_2^+	3.17
Sb 217.581 (I)	5.70	-	-	-

Lines: I – atomic line; II ionic line

‡E sum= E ionization + excitation

¤ A x M treatment