

Rapid and targeted HILIC-MS/MS quantification of urinary metabolites reveals metabolic alterations in COVID-19 patients

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Supplementary information

Table S1 Optimized MRM transitions for urinary metabolites with retention time values acquired under optimized conditions on the BEH amide column.

Analyte	Precursor	Product	Collision energy [V]	Quant / qual	Ionization	Retention time [min]
urea	61	44	30	quant	+	0.38
creatinine	114	86	10	quant	+	0.49
		44	18	qual		
<i>tele</i> -MIAA	141	95	14	quant	+	1.62
		42	54	qual		
uric acid	167	124	14	quant	-	1.73
		42	60	qual		
1-methylhistamine	126	109	14	quant	+	1.74
		68	20	qual		
<i>pi</i> -MIAA	141	95	30	quant	+	2.22
		42	54	qual		
creatine	132	90	16	quant	+	2.31
		44	20	qual		
guanidinoacetic acid	118	76	15	quant	+	2.34
		72	20	qual		
1-methylhistidine	170	124	14	quant	+	2.44
		83	30	qual		
3-methylhistidine	170	96	29	quant	+	2.57
		109	20	qual		

urea-¹⁵N₂	63	45	30	quant	+	
creatinine-D₃	117	89	10	quant	+	0.49
uric acid-¹⁵N₂	169	125	14	quant	-	1.69
1-methylhistamine-D₃	129	112	14	quant	+	1.77
creatine-D₃	135	93	16	quant	+	2.31
1-methylhistidine-D₃	173	127	14	quant	+	2.44
3-methylhistidine-D₃	173	99	20	quant	+	2.57

Table S2 Validation parameters for urinary metabolites on the BEH amide column

Analyte	Internal standard	LOD [nM]	LOQ [nM]	Linear calibration range [nM]	Response function	R^2	Weight	Carry-over [%]
urea	urea- ¹⁵ N ₂	70	200	300 - 100000	linear	0.9953	1/x	0
creatinine	creatinine-D ₃	0.1	0.7	10 – 100000	linear	0.9982	1/x	0
<i>tele</i> -MIAA	N/A	0.3	1	1 – 20000	power	0.9710	1/x	0.006
uric acid	uric acid- ¹⁵ N ₂	200	500	300 – 10000	linear	0.9615	1/x	0
1-methylhistamine	1-methylhistamine-D ₃	3	10	10 – 100000	power	0.9967	1/x	0.025
<i>pi</i> -MIAA	N/A	0.3	1	1 – 20000	power	0.9648	1/x	0.0066
creatine	creatine-D ₃	3	10	10 – 100000	linear	0.9966	1/x	0.0079
guanidinoacetic acid	N/A	30	100	50 – 50000	linear	0.9981	1/x	0
1-methylhistidine	1-methylhistidine-D ₃	1	5	10 – 100000	linear	0.9954	1/x	0.15
3-methylhistidine	3-methylhistidine-D ₃	1	10	10 – 100000	linear	0.9981	1/x	0.22

 R^2 – coefficient of determination

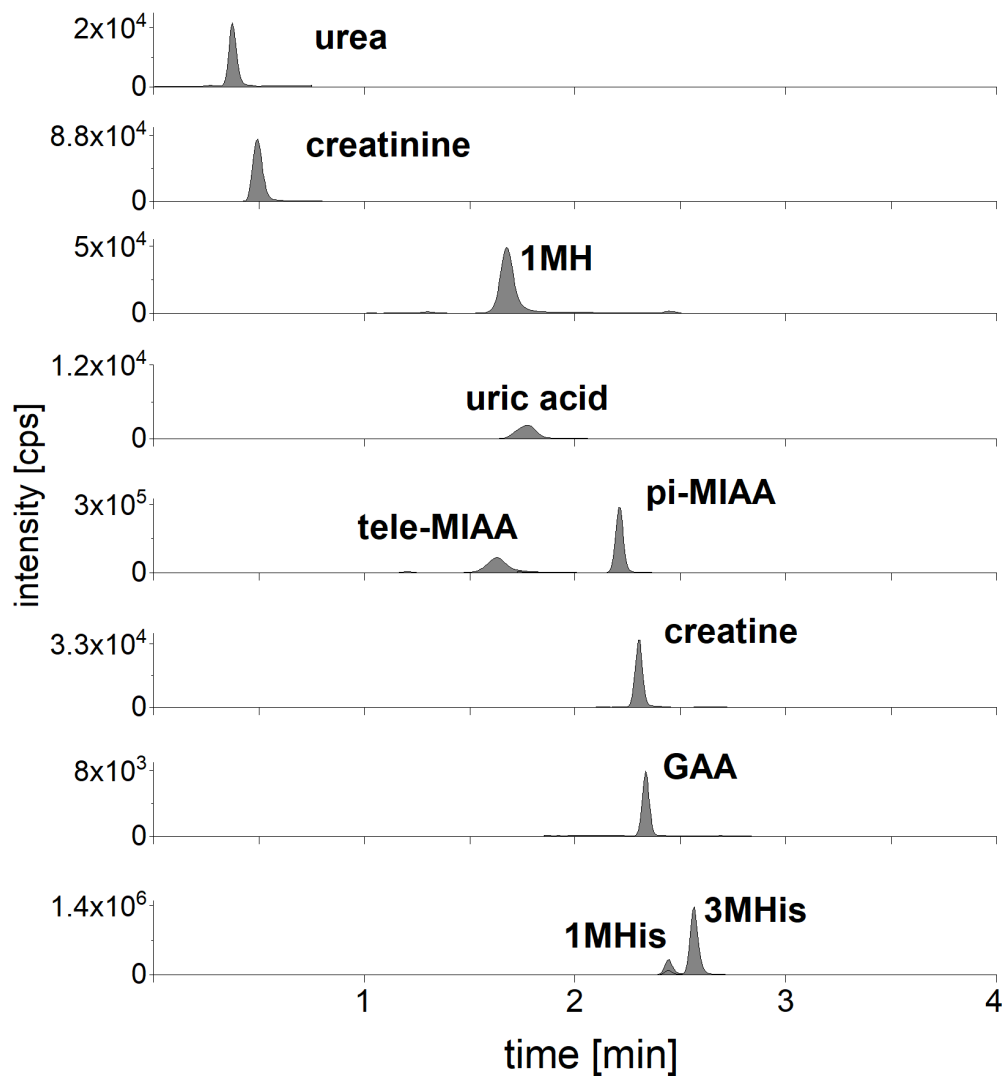


Figure S1 Extracted ion chromatograms obtained from measurements of 150x diluted urine (1MH, tele.MIAA, pi-MIAA, creatine, GAA, 1MHis, 3MHis) and 6000x diluted urine (creatinine, urea, uric acid)