

● Analysis Report

Bruker IVDr Quantification in URine B.I.Quant-UR bTM

Sample ID: ALZ_Urine_Rack01_RCM_221214_expno780.100000.10r

Measuring Date: 24-Dec-2014 08:15:47

Reporting Date: 12-Dec-2020 15:52:43, 7 page(s), Version 1.1.0

Quantification Method Version: Quant-UR B.1.1.0

Disclaimer

RESEARCH USE ONLY: This is no clinical diagnostic analysis report. Must not be used for clinical (medical or IVD) diagnosis or for patient management! Additional concentration range information (95% range) provided numerically or graphically in this report must not be used for clinical diagnostic interpretation.

Application of B.I.Quant-UR B 1.1.0 requires use of Bruker's B.I.Methods SOP for urine.

Summary

The following metabolites were found with concentrations outside the 95% range of Bruker Quant-UR B.1.1.0 urine metabolite concentration database:

Amines and derivatives: Trimethylamine (28 mmol/mol Crea),


Carboxylic acids: Acetic acid (190 mmol/mol Crea), Lactic acid (140 mmol/mol Crea).

Further detailed information is provided on the following pages.

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1 Creatinine

Compound	Conc. mmol/L	LOD mmol/L	r mmol/L	ρ %	Δ mmol/L	95% Range ^(*) mmol/L
Creatinine	2.7	0.3	2.676	100 ●	0.098	1 - 19 















(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

2 Amines and derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range ^(*) $\frac{\text{mmol}}{\text{mol Crea}}$
Dimethylamine	0.09	35	31	0.093	100 ●	0.003	≤ 54 
Trimethylamine	0.07	28	2	0.074	100 ●	0.004	≤ 3 




(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

3 Amino acids and derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range ^(*) $\frac{\text{mmol}}{\text{mol Crea}}$
1-Methylhistidine	< 0.04	< 15	15	0.000	0 ○	0.032	≤ 15 
2-Furoylglycine	< 0.10	< 39	39	0.000	0 ○	0.030	≤ 40 
4-Aminobutyric acid	< 0.05	< 20	20	0.040	27 ○	0.064	≤ 20 
Alanine	0.10	38	10	0.101	100 ●	0.008	11 - 72 
Arginine	< 2.0	< 750	750	0.311	25 ○	0.608	≤ 750 
Betaine	0.04	13	7	0.036	100 ●	0.003	9 - 78 
Creatine	< 0.13	< 50	50	0.093	100 ●	0.098	≤ 280 
Glycine	0.64	240	34	0.642	100 ●	0.019	38 - 440 
Guanidinoacetic acid	< 0.28	< 100	100	0.232	98 ●	0.030	≤ 140 
Methionine	< 0.05	< 18	18	0.000	0 ○	0.114	≤ 18 
N,N-Dimethylglycine	0.03	11	5	0.030	86 ●	0.008	≤ 15 
Sarcosine	< 0.01	< 2	2	0.003	0 ○	0.008	≤ 7 
Taurine	< 0.38	< 140	140	0.163	64 ○	0.178	≤ 170 
Valine	< 0.01	< 2	2	0.004	46 ○	0.006	≤ 7 











(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

4 Benzene and substituted derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
Benzoic acid	< 0.03	< 10	10	0.000	0 ○	0.051	≤ 10 
D-Mandelic acid	< 0.01	< 2	2	0.000	0 ○	0.751	2 - 17 
Hippuric acid	1.5	580	170	1.550	100 ●	0.118	≤ 660 


(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

5 Carboxylic acids

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
Acetic acid	0.51	190	5	0.513	100 ●	0.024	≤ 51 
Citric acid	1.5	540	40	1.458	100 ●	0.085	≤ 700 
Formic acid	< 0.03	< 10	10	0.007	87 ●	0.002	≤ 43 
Fumaric acid	0.01	2	2	0.005	100 ●	0.000	≤ 3 
Imidazole	< 0.13	< 48	48	0.018	41 ○	0.018	≤ 48 
Lactic acid	0.38	140	49	0.379	100 ●	0.036	≤ 110 
Proline betaine	< 0.07	< 25	25	0.059	31 ○	0.065	≤ 280 
Succinic acid	0.05	19	5	0.050	97 ●	0.008	≤ 39 
Tartaric acid	< 0.01	< 5	5	0.012	89 ●	0.004	≤ 110 
Trigonelline	0.11	39	35	0.105	100 ●	0.002	≤ 67 







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6 Fatty acids and derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
2-Methylsuccinic acid	< 0.13	< 48	48	0.000	0 ○	0.107	≤ 48 








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7 Keto acids and derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
2-Oxoglutaric acid	< 0.25	< 92	92	0.058	44 ○	0.077	≤ 92 
3-Hydroxybutyric acid	< 0.28	< 100	100	0.043	38 ○	0.124	≤ 100 
Acetoacetic acid	0.05	17	14	0.046	81 ○	0.030	≤ 30 
Acetone	0.01	3	2	0.007	94 ●	0.002	≤ 7 
Oxaloacetic acid	0.08	30	17	0.081	91 ●	0.049	≤ 66 
Pyruvic acid	< 0.02	< 9	9	0.012	64 ○	0.005	≤ 13 







(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

8 Purine, Pyridine and Pyrimidine derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
1-Methyladenosine	< 0.01	< 5	5	0.000	0 ○	0.071	≤ 5 
1-Methylnicotinamide	< 0.09	< 32	32	0.023	81 ○	0.012	≤ 32 
Adenosine	< 1.00	< 390	390	0.000	0 ○	0.679	≤ 390 
Allantoin	0.04	17	17	0.045	99 ●	0.003	≤ 47 
Allopurinol	< 0.03	< 10	10	0.011	79 ○	0.012	≤ 11 
Caffeine	< 0.12	< 45	45	0.043	96 ●	0.045	≤ 61 
Inosine	< 0.05	< 19	19	0.007	86 ●	0.013	≤ 19 

(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

9 Sugars and derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
D-Galactose	< 0.12	< 43	43	0.000	0 ○	0.035	≤ 44 
D-Glucose	< 0.09	< 34	34	0.085	94 ●	0.014	≤ 140 
D-Lactose	< 0.26	< 96	96	0.072	74 ○	0.358	≤ 96 
D-Mannitol	< 0.49	< 180	180	0.000	0 ○	1.128	≤ 180 
D-Mannose	< 0.02	< 6	6	0.000	0 ○	0.104	≤ 8 
Myo-Inositol	< 12	< 4400	4400	0.000	0 ○	1.366	≤ 4400 

(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

10 Explanations

This section contains the definition of the parameters used above. In the section 10.1 a short manual, how to interpret the results, is presented. The section 10.3 contains the exact definitions of the parameters r , ρ and Δ .

10.1 How to read the result

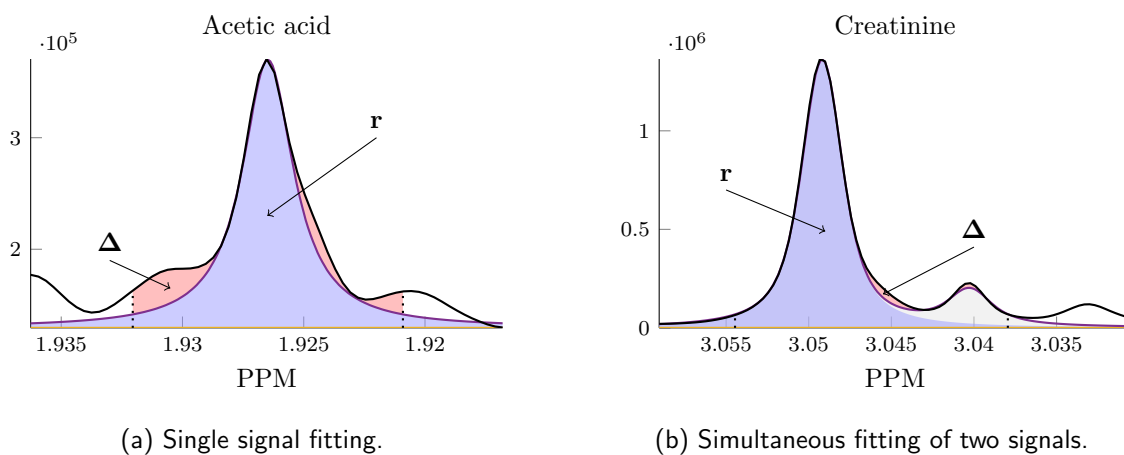


Figure 1: Examples of fitting.

In the figure 1(a), the black line, the blue line and the yellow line represent the original spectrum, the calculated signal fit and its baseline, respectively.

The blue area relates to the metabolite concentration to be determined and the red area represents a residue.

In case of the signal overlap a different approach is used: two or more overlapping signals are being fitted simultaneously. The most iconic example of such signals are the ones generated by CH_3 groups of Creatinine and Creatine. In such a case, the blue line and the grey area relate the sum of all fitted signals. The blue area corresponds to the concentration of the metabolite of interest (cf. figure 1(b)).

10.2 Result parameters

- Conc.** is the final result concentration of the metabolite,
- LOD** is the *limit of detection* of the given metabolite,
- r** is the *raw concentration* i.e. the concentration equivalent of the resulting signal fit prior to comparing to **LOD** (relates to the blue area, cf. α),
- ρ is the correlation of lineshape metabolite signal with calculated fit characterizing the match between metabolite signal and fit (cf. β). Depending on the value of ρ , the following *flag* is displayed:

- ●, if the correlation is 95%,
 - ●, if the correlation is in between 85% and 95%,
 - ○, if the correlation is less than 85%,
- e) Δ is the concentration equivalent of the difference between metabolite signal and calculated fit (residue corresponding to the **the red area**, cf. γ)).

10.3 Detailed definitions

Let s , f and b denote the functions describing the *raw spectra*, *fitted curve* and *(fitted) baseline* respectively. These functions are chosen such that $s \approx f + b$. Moreover, let I be a relevant PPM interval and P_N be the proton number for given metabolite/signal.

α) r (*raw concentration*) is defined as

$$r = \frac{1}{P_N} \int_{\mathbb{R}} f(\xi) d\xi.$$

β) ρ is the *correlation* of the functions s and $f + b$, i.e.

$$\rho = \max(0, \text{corr}(\bar{s}, \overline{f+b})),$$

where \bar{s} , $\overline{f+b}$ are numerical representations of the functions s and $f + b$ on sufficiently fine mesh of the interval I .

γ) Δ is the the area between the raw signal s and the fitted data $f + b$ on the interval I expressed in the terms of the concentration, i.e.

$$\Delta = \frac{1}{P_N} \int_I |s(\xi) - f(\xi) - b(\xi)| d\xi.$$