

● Analysis Report

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

Sample ID: ALZ_Urine_Rack01_RCM_221214_expno450.100000.10r

Measuring Date: 24-Dec-2014 00:32:58

Reporting Date: 12-Dec-2020 15:28:14, 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:

Creatinine: Creatinine (23 mmol/L),


Amino acids and derivatives: Betaine (7 mmol/mol Crea).

Further detailed information is provided on the following pages.

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
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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	23	0.3	22.72	100 ●	0.611	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	< 0.69	< 31	31	0.585	100 ●	0.032	≤ 54 
Trimethylamine	< 0.04	< 2	2	0.003	0 ○	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	< 0.34	< 15	15	0.000	0 ○	0.152	≤ 15 
2-Furoylglycine	< 0.87	< 39	39	0.051	0 ○	0.080	≤ 40 
4-Aminobutyric acid	< 0.45	< 20	20	0.000	0 ○	0.810	≤ 20 
Alanine	0.31	14	10	0.315	99 ●	0.037	11 - 72 
Arginine	< 17	< 750	750	1.012	24 ○	2.059	≤ 750 
Betaine	0.16	7	7	0.159	97 ●	0.165	9 - 78 
Creatine	< 1.1	< 50	50	0.271	100 ●	0.611	≤ 280 
Glycine	1.1	48	34	1.089	100 ●	0.073	38 - 440 
Guanidinoacetic acid	< 2.3	< 100	100	0.280	0 ○	0.633	≤ 140 
Methionine	< 0.41	< 18	18	0.067	90 ●	0.058	≤ 18 
N,N-Dimethylglycine	< 0.12	< 5	5	0.101	63 ○	0.051	≤ 15 
Sarcosine	< 0.04	< 2	2	0.020	0 ○	0.032	≤ 7 
Taurine	< 3.2	< 140	140	2.785	100 ●	0.290	≤ 170 
Valine	0.05	2	2	0.050	97 ●	0.011	≤ 7 











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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	< 0.22	< 10	10	0.034	82 ○	0.017	≤ 10 
D-Mandelic acid	< 0.05	< 2	2	0.000	0 ○	0.103	2 - 17 
Hippuric acid	< 3.9	< 170	170	3.099	99 ●	0.274	≤ 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	< 0.11	< 5	5	0.067	75 ○	0.039	≤ 51 
Citric acid	2.0	86	40	1.957	99 ●	0.424	≤ 700 
Formic acid	0.23	10	10	0.230	99 ●	0.022	≤ 43 
Fumaric acid	< 0.04	< 2	2	0.006	94 ●	0.001	≤ 3 
Imidazole	< 1.1	< 48	48	0.000	0 ○	0.274	≤ 48 
Lactic acid	< 1.1	< 49	49	0.212	97 ●	0.072	≤ 110 
Proline betaine	< 0.57	< 25	25	0.114	40 ○	0.085	≤ 280 
Succinic acid	< 0.11	< 5	5	0.061	96 ●	0.009	≤ 39 
Tartaric acid	< 0.11	< 5	5	0.029	94 ●	0.025	≤ 110 
Trigonelline	< 0.79	< 35	35	0.094	100 ●	0.003	≤ 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	< 1.1	< 48	48	0.000	0 ○	0.396	≤ 48 








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

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	< 2.1	< 92	92	0.000	0 ○	1.088	≤ 92 
3-Hydroxybutyric acid	< 2.3	< 100	100	0.000	0 ○	1.506	≤ 100 
Acetoacetic acid	< 0.32	< 14	14	0.234	93 ●	0.083	≤ 30 
Acetone	< 0.04	< 2	2	0.024	81 ○	0.016	≤ 7 
Oxaloacetic acid	0.56	25	17	0.559	98 ●	0.218	≤ 66 
Pyruvic acid	< 0.20	< 9	9	0.042	86 ●	0.015	≤ 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	< 0.11	< 5	5	0.000	0 ○	0.193	≤ 5 
1-Methylnicotinamide	< 0.72	< 32	32	0.067	99 ●	0.005	≤ 32 
Adenosine	< 8.8	< 390	390	0.000	0 ○	3.351	≤ 390 
Allantoin	< 0.38	< 17	17	0.324	93 ●	0.072	≤ 47 
Allopurinol	< 0.22	< 10	10	0.060	70 ○	0.062	≤ 11 
Caffeine	< 1.00	< 45	45	0.268	98 ●	0.269	≤ 61 
Inosine	< 0.43	< 19	19	0.063	44 ○	0.102	≤ 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	< 0.98	< 43	43	0.000	0 ○	0.055	≤ 44 
D-Glucose	< 0.77	< 34	34	0.667	96 ●	0.160	≤ 140 
D-Lactose	< 2.2	< 96	96	0.036	53 ○	0.066	≤ 96 
D-Mannitol	< 4.2	< 180	180	0.000	0 ○	5.586	≤ 180 
D-Mannose	< 0.13	< 6	6	0.000	0 ○	0.130	≤ 8 
Myo-Inositol	< 100	< 4400	4400	0.648	21 ○	8.314	≤ 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

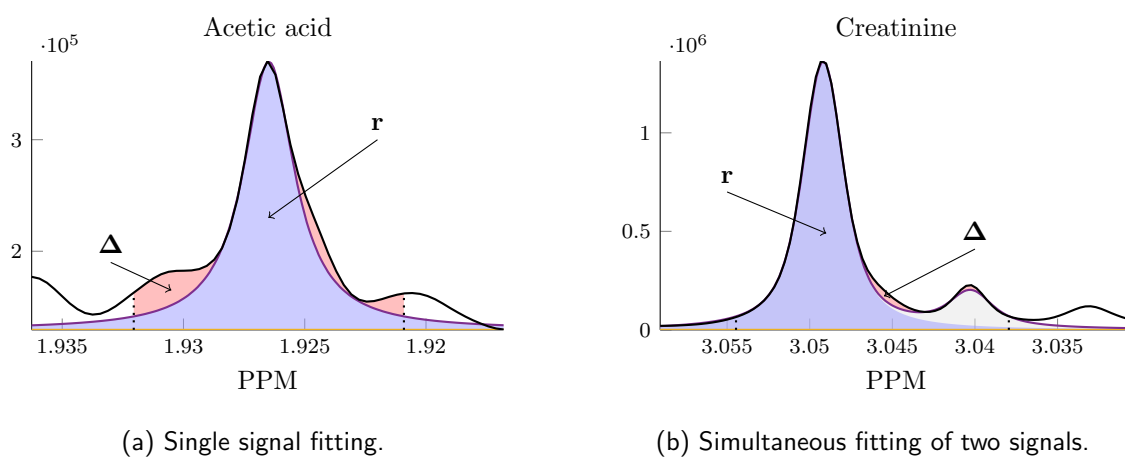


Figure 1: Examples of fitting.

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.

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