Analysis Report

Bruker IVDr Quantification in URine B.I.Quant-UR b™

Sample ID: ALZ_Urine_Rack03_RCM_06012015_expno310.100000.1

Measuring Date: 14-Jan-2015 14:38:58
Reporting Date: 14-Dec-2020 15:11:28, 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:

Amino acids and derivatives: Betaine (8 mmol/mol Crea).

Further detailed information is provided on the following pages.

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USt-Ident.-Nr DE 143 239 759
WEEE-Reg.-Nr. DE 43 181 702
Steuer-Nr. 31190/39205
Handelsregister Mannheim HRB 10 23 68
Sitz der Gesellschaft: 76287 Rheinstetten

Contents

1 Creatinine

Compound	Conc. mmol/L	LOD mmol/L	r mmol/L	ρ %	Δ mmol/L	95% Range(*) mmol/L
Creatinine	5.1	0.3	5.078	100 ●	0.148	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	0.16	32	31	0.161	100 ●	0.003	$\leq$ 54
Trimethylamine	$<$ 0.01	$<$ 2	2	0.003	99 ●	0.000	$\leq$ 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	$<$ 0.08	$<$ 15	15	0.000	0 ○	0.047	$\leq$ 15
2-Furoylglycine	$<$ 0.20	$<$ 39	39	0.116	99 ●	0.008	$\leq$ 40
4-Aminobutyric acid	$<$ 0.10	$<$ 20	20	0.000	0 ○	0.192	$\leq$ 20
Alanine	0.15	29	10	0.148	100 ●	0.009	11 - 72
Arginine	$<$ 3.8	$<$ 750	750	0.394	0 ○	0.692	$\leq$ 750
Betaine	0.04	8	7	0.040	100 ●	0.010	9 - 78
Creatine	0.26	51	50	0.257	100 ●	0.148	$\leq$ 280
Glycine	0.66	130	34	0.657	100 ●	0.022	38 - 440
Guanidinoacetic acid	$<$ 0.52	$<$ 100	100	0.312	88 ●	0.127	$\leq$ 140
Methionine	$<$ 0.09	$<$ 18	18	0.000	0 ○	0.375	$\leq$ 18
N,N-Dimethylglycine	0.04	7	5	0.037	88 ●	0.011	$\leq$ 15
Sarcosine	$<$ 0.01	$<$ 2	2	0.005	0 ○	0.008	$\leq$ 7
Taurine	$<$ 0.72	$<$ 140	140	0.361	94 ●	0.142	$\leq$ 170
Valine	0.02	4	2	0.023	72 ○	0.011	$\leq$ 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	< 0.05	< 10	10	0.000	0 ○	0.037	≤ 10
D-Mandelic acid	< 0.01	< 2	2	0.000	0 ○	0.068	2 - 17
Hippuric acid	1.1	220	170	1.098	100 ●	0.075	≤ 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	0.09	17	5	0.086	99 ●	0.012	≤ 51
Citric acid	1.6	320	40	1.607	100 ●	0.112	≤ 700
Formic acid	0.13	25	10	0.129	100 ●	0.005	≤ 43
Fumaric acid	< 0.01	< 2	2	0.004	70 ○	0.001	≤ 3
Imidazole	< 0.24	< 48	48	0.033	9 ○	0.037	≤ 48
Lactic acid	< 0.25	< 49	49	0.154	97 ●	0.040	≤ 110
Proline betaine	0.26	50	25	0.256	96 ●	0.046	≤ 280
Succinic acid	0.13	25	5	0.129	97 ●	0.021	≤ 39
Tartaric acid	0.05	10	5	0.053	99 ●	0.006	≤ 110
Trigonelline	< 0.18	< 35	35	0.129	100 ●	0.003	≤ 67

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

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	< 0.24	< 48	48	0.000	0 ○	0.189	≤ 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	< 0.47	< 92	92	0.018	68 ○	0.154	≤ 92
3-Hydroxybutyric acid	< 0.52	< 100	100	0.000	0 ○	0.446	≤ 100
Acetoacetic acid	< 0.07	< 14	14	0.055	90 ●	0.027	≤ 30
Acetone	0.02	4	2	0.023	99 ●	0.003	≤ 7
Oxaloacetic acid	< 0.09	< 17	17	0.082	83 ○	0.071	≤ 66
Pyruvic acid	< 0.04	< 9	9	0.034	83 ○	0.012	≤ 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	< 0.03	< 5	5	0.000	0 ○	0.092	≤ 5
1-Methylnicotinamide	< 0.16	< 32	32	0.049	99 ●	0.005	≤ 32
Adenosine	< 2.0	< 390	390	0.000	0 ○	0.909	≤ 390
Allantoin	< 0.08	< 17	17	0.058	100 ●	0.004	≤ 47
Allopurinol	< 0.05	< 10	10	0.033	85 ●	0.046	≤ 11
Caffeine	< 0.23	< 45	45	0.104	94 ●	0.110	≤ 61
Inosine	< 0.10	< 19	19	0.014	93 ●	0.046	≤ 19

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

9 Sugars and derivatives

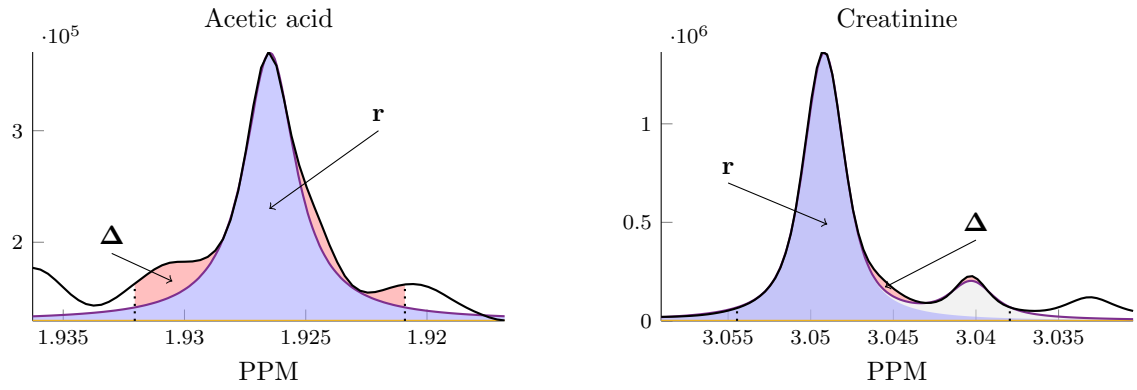
Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
D-Galactose	< 0.22	< 43	43	0.017	95 ●	0.001	≤ 44
D-Glucose	< 0.17	< 34	34	0.151	79 ○	0.061	≤ 140
D-Lactose	< 0.49	< 96	96	0.142	78 ○	0.095	≤ 96
D-Mannitol	< 0.93	< 180	180	0.000	0 ○	1.894	≤ 180
D-Mannose	< 0.03	< 6	6	0.000	0 ○	0.060	≤ 8
Myo-Inositol	< 23	< 4400	4400	0.000	0 ○	5.316	≤ 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 $\mathbf{r}$, ρ and $\mathbf{\Delta}$.

10.1 How to read the result



(a) Single signal fitting.

(b) Simultaneous fitting of two signals.

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 $\mathrm{CH_3}$ 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

a) **Conc.** is the final result concentration of the metabolite,

b) **LOD** is the *limit of detection* of the given metabolite,

c) $\mathbf{r}$ 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)),

d) 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) $\mathbf{r}$ (*raw concentration*) is defined as

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

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

$$\rho = \max\left(0, \operatorname{corr}\left(\overline{s}, \overline{f+b}\right)\right),$$

where $\overline{s}$, $\overline{f+b}$ 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.

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