

# ● Analysis Report

## Bruker IVDr Quantification in URine B.I.Quant-UR b<sup>TM</sup>

Sample ID: ALZ\_Urine\_Rack01\_RCM\_221214\_expno830.100000.10r

Measuring Date: 24-Dec-2014 09:29:55

Reporting Date: 12-Dec-2020 12:40:36, 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

All metabolites were found with concentrations inside the 95% range of Bruker Quant-UR B.1.1.0 urine metabolite concentration database.

## Contents



<b>1 Creatinine</b>	<b>3</b>
<b>2 Amines and derivatives</b>	<b>3</b>
<b>3 Amino acids and derivatives</b>	<b>3</b>
<b>4 Benzene and substituted derivatives</b>	<b>4</b>
<b>5 Carboxylic acids</b>	<b>4</b>
<b>6 Fatty acids and derivatives</b>	<b>4</b>
<b>7 Keto acids and derivatives</b>	<b>5</b>
<b>8 Purine, Pyridine and Pyrimidine derivatives</b>	<b>5</b>
<b>9 Sugars and derivatives</b>	<b>5</b>
<b>10 Explanations</b>	<b>6</b>

## 1 Creatinine

Compound	Conc. mmol/L	LOD mmol/L	r mmol/L	$\rho$ %	$\Delta$ mmol/L	95% Range <sup>(*)</sup> mmol/L
Creatinine	9.3	0.3	9.263	100 ●	0.161	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	$\rho$ %	$\Delta$ mmol/L	95% Range <sup>(*)</sup> $\frac{\text{mmol}}{\text{mol Crea}}$
Dimethylamine	< 0.28	< 31	31	0.266	100 ●	0.009	≤ 54 
Trimethylamine	< 0.02	< 2	2	0.002	0 ○	0.006	≤ 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	$\rho$ %	$\Delta$ mmol/L	95% Range <sup>(*)</sup> $\frac{\text{mmol}}{\text{mol Crea}}$
1-Methylhistidine	< 0.14	< 15	15	0.000	0 ○	0.070	≤ 15 
2-Furoylglycine	< 0.36	< 39	39	0.000	0 ○	0.058	≤ 40 
4-Aminobutyric acid	< 0.18	< 20	20	0.000	0 ○	0.336	≤ 20 
Alanine	0.23	24	10	0.225	100 ●	0.011	11 - 72 
Arginine	< 6.9	< 750	750	0.539	5 ○	1.469	≤ 750 
Betaine	0.14	15	7	0.135	100 ●	0.032	9 - 78 
Creatine	< 0.46	< 50	50	0.116	100 ●	0.161	≤ 280 
Glycine	0.66	71	34	0.659	100 ●	0.039	38 - 440 
Guanidinoacetic acid	< 0.96	< 100	100	0.310	8 ○	0.402	≤ 140 
Methionine	< 0.17	< 18	18	0.012	93 ●	0.025	≤ 18 
N,N-Dimethylglycine	0.06	7	5	0.064	75 ○	0.030	≤ 15 
Sarcosine	< 0.02	< 2	2	0.017	0 ○	0.036	≤ 7 
Taurine	< 1.3	< 140	140	1.217	99 ●	0.162	≤ 170 
Valine	0.03	3	2	0.026	67 ○	0.013	≤ 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	$\rho$ %	$\Delta$ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
Benzoic acid	< 0.09	< 10	10	0.000	0○	0.034	≤ 10 
D-Mandelic acid	< 0.02	< 2	2	0.000	0○	0.007	2 - 17 
Hippuric acid	1.9	200	170	1.888	100●	0.163	≤ 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	$\rho$ %	$\Delta$ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
Acetic acid	< 0.04	< 5	5	0.042	91●	0.014	≤ 51 
Citric acid	1.7	180	40	1.665	100●	0.278	≤ 700 
Formic acid	0.20	22	10	0.201	100●	0.007	≤ 43 
Fumaric acid	< 0.02	< 2	2	0.004	97●	0.001	≤ 3 
Imidazole	< 0.44	< 48	48	0.044	48○	0.047	≤ 48 
Lactic acid	< 0.45	< 49	49	0.033	57○	0.104	≤ 110 
Proline betaine	0.25	27	25	0.247	100●	0.044	≤ 280 
Succinic acid	< 0.04	< 5	5	0.030	82○	0.012	≤ 39 
Tartaric acid	< 0.04	< 5	5	0.015	86●	0.009	≤ 110 
Trigonelline	< 0.32	< 35	35	0.044	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	$\rho$ %	$\Delta$ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
2-Methylsuccinic acid	< 0.44	< 48	48	0.000	0○	0.240	≤ 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	$\rho$ %	$\Delta$ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
2-Oxoglutaric acid	< 0.85	< 92	92	0.000	50 ○	0.445	≤ 92 
3-Hydroxybutyric acid	< 0.95	< 100	100	0.149	23 ○	0.515	≤ 100 
Acetoacetic acid	< 0.13	< 14	14	0.087	93 ●	0.034	≤ 30 
Acetone	0.02	2	2	0.020	98 ●	0.003	≤ 7 
Oxaloacetic acid	0.28	30	17	0.279	94 ●	0.128	≤ 66 
Pyruvic acid	< 0.08	< 9	9	0.035	98 ●	0.004	≤ 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	$\rho$ %	$\Delta$ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
1-Methyladenosine	< 0.04	< 5	5	0.000	0 ○	0.118	≤ 5 
1-Methylnicotinamide	< 0.29	< 32	32	0.028	94 ●	0.007	≤ 32 
Adenosine	< 3.6	< 390	390	0.000	0 ○	1.596	≤ 390 
Allantoin	< 0.15	< 17	17	0.145	94 ●	0.031	≤ 47 
Allopurinol	< 0.09	< 10	10	0.043	55 ○	0.050	≤ 11 
Caffeine	< 0.42	< 45	45	0.153	97 ●	0.153	≤ 61 
Inosine	< 0.18	< 19	19	0.016	56 ○	0.063	≤ 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	$\rho$ %	$\Delta$ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
D-Galactose	< 0.40	< 43	43	0.000	0 ○	0.044	≤ 44 
D-Glucose	< 0.32	< 34	34	0.265	93 ●	0.055	≤ 140 
D-Lactose	< 0.89	< 96	96	0.086	83 ○	0.164	≤ 96 
D-Mannitol	< 1.7	< 180	180	0.929	66 ○	0.943	≤ 180 
D-Mannose	< 0.06	< 6	6	0.024	0 ○	0.038	≤ 8 
Myo-Inositol	< 41	< 4400	4400	0.000	0 ○	7.606	≤ 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  $r$ ,  $\rho$  and  $\Delta$ .

### 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  $\text{CH}_3$  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.  $\alpha$ ),
- $\rho$  is the correlation of lineshape metabolite signal with calculated fit characterizing the match between metabolite signal and fit (cf.  $\beta$ ). Depending on the value of  $\rho$ , 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)  $\Delta$  is the concentration equivalent of the difference between metabolite signal and calculated fit (residue corresponding to the **the red area**, cf.  $\gamma$ )).

### 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.

$\alpha$ )  $r$  (*raw concentration*) is defined as

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

$\beta$ )  $\rho$  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  $I$ .

$\gamma$ )  $\Delta$  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.

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