

CHAPTER: 08

THE CAUSE AND IMPACT OF METABOLITES IN METABOLOMICS ANALYSIS

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The study of metabolites plays an important role in disease identification but these metabolites may be generated in the sample due to other factors as well. These metabolites are tabulated in this chapter.

The concise table of metabolites that get affected by improper sample handling as well as due to pathological state.

Metabolite in plasma/serum	Pre-analytical bias	Cellular Processes	Pathology
Citrate	Collection with citrate as additive (Beckonert, Keun et al. 2007), Decrease during freeze drying and freeze-thaw process, Dilution (400%) causes increase; protein precipitation by acetone causes decrease (Deprez, Sweatman et al. 2002)	Intermediate TCA cycle; increased NO synthase activity = Arg → Citrate+ NO; Glycolysis-citrate-lipogenesis (Costello and Franklin 2005)	Breast cancer, Colorectal Cancer (Okamoto, Miyagi et al. 2009), Oral cancer (Tiziani, Lopes et al. 2009), Lung cancer (Rocha, Carrola et al. 2011)
Formate	Loss during freeze drying due to volatility (Deprez, Sweatman et al. 2002)	Kreb's cycle intermediate (Tiziani, Lopes et al. 2009)	Oral cancer (Tiziani, Lopes et al. 2009)
Tyrosine	Increases during storage at room temperature due to enzymatic activity (Deprez, Sweatman et al. 2002)		

Phenylalanine	Increases during storage at room temperature due to enzymatic activity (Deprez, Sweatman et al. 2002)		
Glycerol	Increases during storage at room temperature and 4°C due to action of lipases (Deprez, Sweatman et al. 2002)		
VLDL	Decrease and line broadening in methyl and methylene resonances while storage at 4°C, -20 °C, and freeze-thawing process due to enzymatic activity. Also vary from morning to evening time points (Bell, Brown et al. 1988; Deprez, Sweatman et al. 2002)		
Chylomicrons	Decrease and line broadening in methyl and methylene resonances while storage at 4°C, -20		

	°C and freeze-thawing process due to enzymatic activity (Bell, Brown et al. 1988; Deprez, Sweatman et al. 2002)		
3-Hydroxybutyrate	Increases at 4°C due to enzymatic activity (Deprez, Sweatman et al. 2002)		
Acetate	Increases at 4°C (Deprez, Sweatman et al. 2002)		
Pyruvate	Decreases at 4°C storage; decreases between morning and evening time points (Deprez, Sweatman et al. 2002)		
Choline	Increases at 4°C (Deprez, Sweatman et al. 2002)		
Lactate	Decreases between morning and evening time points (Deprez, Sweatman et al. 2002)		
Creatine	Decreases between morning and evening time points (Deprez, Sweatman		

	et al. 2002)		
TMAO	Decreases between morning and evening time points (Deprez, Sweatman et al. 2002)		