

ABSTRACT

Charles University, Faculty of Pharmacy in Hradec Králové

Department of Department of Analytical Chemistry

Candidate **Mgr. Barbora Červinková**

Supervisor **prof. RNDr. Petr Solich, CSc.**

Title of Doctoral Thesis **Application of modern separation techniques in the analysis of biological material**

The presented dissertation is focused on development, optimization and validation of new extraction procedures and chromatographic methods for determination of vitamins A and E, inflammation biomarkers, DNA and RNA oxidative stress products in biological matrices.

In the theoretical part of this work selected analytes and possibility of their determination in biological materials are described. Moreover, modern trends in liquid chromatography and bioanalytical validation guidelines are included. In this part, special attention is focused on sample handling, transport and pre-treatment.

The second part is focused on published methods and divided into two sections. The first section comments published developed analytical methods. As first method, determination of lipophilic vitamins in human serum by miniaturized liquid-liquid extraction with subsequent separation on fluorinated stationary phase using UHPLC system with fluorescent detection in 4 min is discussed. Thereafter, determination of creatinine, DNA and RNA oxidative stress biomarkers in human urine by selective solid-phase extraction, rapid UHPLC separation including isotope labelled internal standard and sensitive tandem mass spectrometry detection is described. As last method, determination of early inflammatory biomarkers in amniotic fluid, malignant effusions and wound exudates by simple and fast deproteinization, HPLC analysis using second-generation monolith stationary phase, PDA and fluorescent detection is commented. The second section is focused on clinical research publications. In these clinical studies, levels of lipophilic vitamins and inflammatory biomarkers in malignant and eye disease are discussed.

List of author's publications, lectures, posters, grant projects and research internships are included in the last part of dissertation work.