

ABSTRACT

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Department of analytical chemistry

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Title of Doctoral Thesis **Development and optimization of sample preparation step for fast chromatographic analysis.**

The aim of the dissertation thesis is the development of modern extraction methods for the sample purification and for the analytes isolation and preconcentration from various biological materials, including biological fluids (plasma, serum, vaginal lavages) and plant material. Modern approaches have a lots of advantages such as a lower consumption of sample and organic solvents, extraction speed-up, better sample purification, matrix removal and lower influence of matrix effects. Extracts from modern microextraction methods can be analyzed by separation methods including ultra-high performance liquid chromatography and supercritical fluid chromatography coupled with mass spectrometry. The separation methods enable fast high-throughput analysis with sensitive and selective detection.

Individual projects show the possibility of use of the modern approaches in the sample preparation field, where the microextraction by packed sorbent (MEPS), microextraction by solid phase extraction in pipette tips (μ -SPE-PT), or parallel artificial liquid membrane extraction (PALME) can be used for the extraction of analytes. These extraction methods were compared with traditional sample preparation procedures such as protein precipitation and solid phase extraction (analysis of quercetin and its metabolites), modern approaches compared with each other (analysis of farnesol and tyrosol in vaginal lavage, statins extraction using μ -SPE-PT). The first PALME method for extraction of polar basic drugs from human plasma was optimized. New μ -SPE-PT for the selective isolation of auxins from plant material was developed. Liquid-liquid extraction for SFC analysis to determine vitamin E isomeric forms was developed as the other part of the work.