

Abstract

Charles University

Faculty of Pharmacy in Hradec Králové

Department of Analytical Chemistry

Candidate: Jana Nastoupilová

Supervisor: PharmDr. Ivona Lhotská, Ph.D.

Title of diploma thesis: Solid phase extraction using nanofibrous sorbents prior to liquid chromatography for determination of drugs and contaminants

The diploma thesis is focused on the optimization of a new type of solid-phase extraction (SPE) using nanofibrous sorbents filled in centrifugal filters for the determination of contaminants (bisphenols) and drugs. The aim is to increase the quantity of parallel analyses. The composite polymer nPCL/ μ PCL (nano and microfibers of polycaprolactone) was chosen as the tested sorbent because of its promising results in previous works. The aim of the diploma thesis was optimization of conditions for extraction and validation of the method.

The method of choice was microextraction, when discs from nanofibrous sorbent were cut and then filled in centrifugal filters. A centrifuge was used for passing liquid through the sorbent. Analysis was carried out by UHPLC (chromatography column YMC-Triart C18 ExRS, size 100x4.6 mm, particle size 3 μ m) and detection was performed by DAD detector (210 and 220 nm). During the optimization, number of nanofibrous discs filled in centrifugal filters, volume of reagents used for activation, conditioning, and elution, and speed and time of centrifugation were selected. Extraction was tested of contaminants (bisphenols) from river water and drugs from lyophilized serum and urine. The outcome of this diploma thesis is a validated HPLC method for the determination of bisphenols in water after extraction on PCL nanofibrous discs filled in centrifugal filters. Precision for six extractions with deviations of 3 – 4.5 % confirmed a high rate of the method repeatability. According to our results, it can be concluded that the sorbent is selective rather for more lipophilic analytes with logP higher than 3.