

## **Abstract**

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Title of the diploma thesis: The Use of Nanofibers as a Sorbent for Solid Phase Extraction

The thesis is focused on the ability of polyamide 6 nanofibers to efficiently sorb chemical compounds with various physico-chemical properties and on the use of polyamide 6 nanofibers as a modern sorbent for solid-phase extraction (SPE). Analytes from the groups parabens, steroids and flavonoids were chosen as model analytes based on previous studies. Fenoxycarb, permethrin and hydroxypyrene were also tested because polyamid 6 demonstrated good effectivity for lipophilic compounds during the experiment.

The nanofibers for this experiment were prepared using Nanospider™ technology at the Technical University in Liberec. There were made three types of polyamide 6 nanofibers with different surface weight. The effect of these various surface properties was also evaluated in the study.

The chromatography conditions were optimized for each group of substances individually. The nanofibers were placed into an empty SPE cartridge and the following extraction of analytes was made using a SPE manifold. The obtained eluates were analyzed with HPLC-UV system. Evaluation of the extraction efficiency of nanofibers was based on the comparison with the standard solution.

The emphasis was placed on the maintaining the same conditions and way of measurement during the experiment to obtain satisfactory results of repeatability. The key step was the construction of cartridges in the beginning of the experiment to provide the uniform flow rate through the sorbent.

Tested polyamide 6 nanofibers were found as a relatively promising sorbent in solid-phase extraction especially for lipophilic compounds and compounds with phenolic group in the molecule. Furthermore, their reusability without any mechanical changes in the nanostructure and spontaneous agglomeration was shown.