ABSTRACT

Charles University in Prague, Faculty of Pharmacy in Hradec Králové
Department of Faculty of Pharmacy in Hradec Králové
Candidate **Mgr. Šárka Zajíčková**
Consultant **Mgr. Hana Bavlovič Piskáčková, Ph.D.**
Title of Thesis **Extraction of amphetamines and synthetic cathinones from breast milk using liquid membrane microextraction techniques**

Amphetamine-type stimulants (ATSs) refer to a group of pharmacological and toxicological agents that have a common phenethylamine structural backbone. In addition to their limited pharmacological use, they are primarily abused as recreational drugs due to their psychostimulant effects. They currently represent the second largest group of illicit used drugs in the world. the second largest group of illicit used drugs in the world. The main representatives of this group include amphetamine (AMF, speed), methamphetamine (MAMF, pervitin) or 3,4-methylenedioxy-N-methamphetamine (MDMA, ecstasy). This ATSs also includes synthetic cathinones, which belong to the group of new psychoactive substances (NPS), which are primarily synthesized in order to circumvent the law, because they are often not included in the list of prohibited drugs. All of these compounds are low molecular weak bases which are widely distributed to tissues and biological fluids, including placenta and breast milk. For these reasons, it is necessary to determine exposure of newborn by these substances, in relevant cases. One of the way to detect this exposure is an analysis of breast milk (MM). Due to the fact that MM is a very complex and variable matrix which contain a large amount of fat and proteins, the pretreatment of the sample is necessary before the analysis. Due to some disadvantages of conventional sample pretreatment techniques, their miniaturization has been a significant trend in recent decades. The aim of this work was to develop microextraction techniques for the isolation of the amphetamines and selected cathinones from breast milk. We focused on microextraction techniques with basis in liquid-liquid extraction, namely electromembrane extraction (EME) and parallel artificial liquid membrane extraction (PALME). These techniques were applied for the isolation of ATSs from MM for the first time. UHPLC-MS/MS with electrospray ionization in positive mode was used for analysis of target analytes.For the separation was used a Luna Omega Polar column and mobile phase consisted from mixture of 0.1% formic acid (A) and acetonitrile (B) in gradient mode. For both micro extraction techniques, the following parameters were optimized: organic solvents for SLM, composition and pH of donor and acceptor phases and extraction time. In addition, the electrical potential was optimized for EME. Extraction techniques followed by UHPLC-MS/MS were successfully validated and used for analysis of 6 real samples.