Abstract

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Title: LC-HRMS analysis of selected drugs in biological material II.

Anxiety disorders affect up to 25 % of the population in their life, the lifetime prevalence is 13,6 %. Insomnia affect at least one third of the population in their life, the prevalence is 15-40 %. Drugs used to treat anxiety and insomnia easily cross the blood-brain barrier and affect the CNS. It is therefore necessary to determine the correct dosing schedule and monitor treatment. The result is optimization of treatment, reduction of side effects and increased patient adherence to treatment. The rapid qualitative and quantitative analysis for urgent cases of intoxication is also needed.

This diploma thesis deals with development and optimization of an extraction method for selected benzodiazepines (alprazolam, bromazepam, diazepam, chlordiazepoxide, clonazepam, midazolam, oxazepam) and zolpidem in human serum. Subsequently, the whole analytical method was validated for use in clinical practice using the UHPLC-HRMS. Protein precipitation with acetonitrile was the most suitable sample preparation before analysis, very good recovery and repeatability were achieved. Quantitative determination was performed by the internal standard method. Diazepam-d_5 was the most suitable internal standard. The validation of the whole analytical method was performed according to the European Medicines Agency directive. The evaluated validation parameters met the required criteria. An external evaluation of the quality of benzodiazepines and zolpidem was also successfully performed. The method has been successfully introduced into the clinical practice.