Abstract

This doctoral dissertation is based on the development of new, fast, simple, and not requiring sophisticated equipment methods for the determination of selected veterinary drugs, such as Cpx and Ofx in meat tissues and human urine, as well as some sedative drugs such as AZN and also its metabolite, i.e. AZL, in meat tissues. Developed methodologies are based on the use of popular and classic separation techniques such as CE with UV-Vis detection and HPLC also with UV-Vis detection. Due to the low concentration sensitivity of CE, especially in the case of the use with UV-Vis detection, I decided to perform the extraction during sample preparation step, but also to use an additional concentration stage during the analysis, inside the capillary, i.e. concentration by transient pseudo-isotachophoresis. The methods I developed for the determination of FQLs are the first ones to be based on CE with transient pseudo-isotachophoresis. As a result of the research being the subject of the dissertation, new analytical methods were developed.

Taking the above considerations into account, the main goal I set myself for the conducted experiments was to develop analytical methods based on popular separation techniques, consisting of as few steps as possible in sample preparation. These steps includes homogenization of meat tissues to enable analysis of a solid sample, extraction for concentration of analytes, but also for purification of the sample matrix, evaporation of the organic solvent to dryness, and dissolution of the evaporation residue in a reduced solvent volume. However, in the case of my HPLC-based method, deproteinization had to be included in the sample preparation stage. In addition, I wanted the developed methods to be also sensitive and reliable.

During my research, I developed four new, original analytical procedures. The first one concerns the electrophoretic determination of Cpx and Ofx in meat tissues using transient pseudo-isotachophoresis. The second method I developed allows for the determination of Cpx and Ofx in human urine using the same analytical technique. The third method is based on the chromatographic determination of AZN and AZL in meat tissues. However, in the fourth developed method, I decided to use a modern extraction technique on magnetic functionalized nanoparticles. These methods are based on simple sample preparation procedure and subsequent analysis using an appropriate separation technique for detection and quantification of analytes. Finally, the methods were validated and I proved that these methodologies are

characterized by satisfactory validation parameters such as low enough LOD and LOQ, and good precision and accuracy. I also proved that these methods can be successfully used for routine analysis of meat and urine samples for the determination of selected veterinary drugs.