Summary

The subject of presented thesis is the phytochemical analysis of plant extracts from the *Lamiaceae* and *Asteraceae* family, using different chromatographic techniques to determine the identity of selected plants (fingerprint). By comparing the obtained chromatograms from TLC, HPLC as well as PCA and similarity measures, it can be distinguished from each other and identify individual species and varieties. The aim of this study was an identification of compounds belonging to the main groups of secondary metabolites, such as phenolic compounds (phenolic acids, flavonoids) and terpenes, and also evaluation of its antioxidant activity.

The analysis included eight species of *Scutellaria*, ten species of basil (*Ocimum* sp.), seven species of lavender (*Lavandula* sp.) and six species of yarrow (*Achillea* sp.). The plants were harvested from the same site and were collected at one time. Plant extracts were obtained using the Soxhlet apparatus and the ultrasound-assisted method and were analyzed by TLC (also microTLC), 2D-TLC and HPLC, after prior optimization of the analysis conditions. These processes allowed the identification of active substances present in the tested extracts by comparison of the R_f values of reference substances.

In addition, appropriate detection by use of derivatizing reagents (Naturtoff reagent, aniseed reagent or DPPH) allowed confirming the results. Also, the use of DPPH reagent gave the opportunity to identify compounds which are scavenging free radicals (yellow discoloration of spots on the chromatography plate). Confirming the antioxidant properties of the investigated extracts, the base of active substances is widened with so desired effects in present times.

The next stage of the study was a chemometric analysis of the obtained chromatograms based on the scans and photos. A series of procedures for processing the received data described in the thesis led to the calculation of similarity measures and principal component analysis (PCA). This analysis allows concluding which of the analyzed samples or plant extracts are similar to each other. High values of Pearson R correlation coefficient, R^2 coefficient of determination and cosine measure confirm the similarity between samples. On the other hand, low values of distance measures confirm the similarity between the analyzed samples. These calculations allow drawing new species with potential therapeutic properties.

Further experiments on extracts from the plant material under investigation will be directed towards direct analysis of the chemical composition of these species, which showed a high content of identified active substances.