The thesis deals with the use of electrophoretic methods in the analysis of pharmaceutically important compounds.
In the theoretical part, the principles of basic techniques (like CZE, MEKC, ITP etc.) as well as on-line preconcentration methods (stacking, sweeping, ITP-CZE, tITP) are described.
The first part of the experimental work deals with the use of on-line sample preconcentration techniques (ITP-CZE and LVSS with polarity switching) for the analysis of the complex matrices of plant origin.
1. The on-line ITP-CZE was used for the separation and quantification of phenolic acids derived from benzoic and cinnamic acids in methanolic extract of Epilobium parviflorum. BGE-S-BGE electrolyte system was used for the separation. The leading electrolyte in the ITP pre-separation step was 0.01M HCl, 0.02M imidazol, 0.2% HEC with pH 7.2; the terminating electrolyte was 0.01M HEPES with pH 8.2. The background electrolyte in the electrophoretic step contained 25mM MES, 50mM TRIS, 30mM boric acid, 10mM α-cyclodextrine, 0.2% HEC of pH 8.3. A single analysis took 25 min. No special sample pretreatment was required.
2. The next work focused on the application of a stacking-CZE method used for the separation and determination of eight phenolic acids in an extract of Epilobium parviflorum. Large-volume sample stacking technique with polarity switching mode was optimized. The optimal electrolyte system consisted of 50mM boric acid and 2% of α-cyclodextrine of pH 9.0. Injected sample volume represented 70 % of the capillary volume and the reverse polarity switching time was 1.8 minutes. A 40-fold sensitivity enhancement was attained.
3. The on-line ITP-CZE was used for the separation and quantification of phenolic acids and flavonoid quercitrin in Melissa officinalis. BGE-S-BGE system was used for the separation. The leading electrolyte in the ITP pre-separation step was 0.01M HCl, 0.02M TRIS, 0.2% HEC of pH* 7.2; the terminating electrolyte was 50mM boric acid of pH* 8.2. The background electrolyte in the

electrophoretic step contained 25mM MOPSO, 50mM TRIS, 40mM boric acid, 0.2% HEC of pH* 8.1. A single analysis took 35 min.
The second part of the scientific work deal with the use of CZE and MEKC in routine pharmaceutical analysis.
4. Capillary zone electrophoresis with indirect UV detection at 215 nm was applied for the separation and determination of mannitol and sorbitol in the form of anionic borate–polyol complexes. The background electrolyte consisted of 50mM borate (pH 9.3, adjusted with triethylamine) containing 10mM 3-nitrobenzoate as the chromogenic co-ion. The separation took about 13 min.
5. Non-steroidal anti-inflammatory drug ketoprofen and preservatives (methylparaben and propylparaben) in a pharmaceutical preparation were analysed by MEKC. The optimum background electrolyte was 50mM tricin, 40mM SDS and 5mM β-cyclodextrine of pH* 8.3. The content of methanol in BGE was 15 % (v/v). Single analysis took less than 12 minutes.