ABSTRACT (EN)

This dissertation thesis is focused on the study of electrochemical properties of new types of carbon paste electrodes (CPE) and carbon fiber rod electrodes (CFRE), which were used for the development of new highly sensitive and selective voltammetric and amperometric methods for the determination of 5-amino-6-nitroquinoline and *trans*- and *cis*-isomers of resveratrol.

The carbon paste electrodes were compared in terms of size of the microparticles of glassy carbon contained in the paste (diameters 0.4 – 12 μm; 10 – 20 μm; 20 – 50 μm) in comparison with carbon paste electrode consisting of crystalline graphite and solid glassy carbon electrode. The electrochemical properties were tested using potassium hexacyanoferrate in an aqueous supporting electrolyte and 5-amino-6-nitroquinoline (5A6NQ) in a mixed methanol-water supporting electrolyte.

The carbon paste electrode was further used in an amperometric detector of a wall-jet type connected in series with a spectrophotometric detector for the development of a new HPLC method with electrochemical detection and spectrophotometric detection for the determination of *trans*-resveratrol and *cis*-resveratrol in samples of grains, hulls and leaves of common and tartary buckwheat. The method was optimized and used for the determination of resveratrol in samples of six varieties of common buckwheat and two varieties of tartary buckwheat.

The electrochemical properties of carbon fiber rod electrodes were tested for the electrodes of various diameters (0.8 mm; 2 mm, and 3 mm) by comparing the parameters in the determination of selected analytes (potassium hexacyanoferrate and 5-amino-6-nitroquinoline) using voltammetric methods (DC voltammetry (DCV), differential pulse voltammetry (DPV), cyclic voltammetry (CV), adsorptive stripping differential pulse voltammetry (AdSDPV)). Practical use of optimized methods was demonstrated on the determination of 5A6NQ at CFRE in model samples of drinking and pond water.

In the last part of the thesis, a new method of determination of *trans*-resveratrol using voltammetric methods (DCV, DPV and AdSDPV) and flow injection analysis (FIA) with electrochemical detection at CFRE was developed and this detection was compared with electrochemical detection at CPE and in case of FIA also with spectrophotometric detection. Practical applications of the new methods were tested by determination of *trans*-resveratrol in Evelor pills.