Abstract

In this work, the possibilities of using an electrochemical dual detector in a flow arrangement were investigated using flow injection analysis. The dual detector was first tested for potassium ferrocyanide for its reversible oxidation at the generation electrode and subsequent reduction at the detection electrode. The possibilities of determination of nitro substances were explored, when hydroxylamine was formed by the reduction of nitro groups on the generation electrode, which was subsequently oxidized on the detection electrode. Thanks to determination in the oxidation potentials, it was possible to avoid the noise caused by oxygen reduction and the detection limit for dinitrophenol 0.47 μmol·dm^{-3} was achieved. The possibilities of using a dual detector for detection in reduction potentials by minimizing the influence of oxygen, by reducing it on the generation electrode, were verified. Furthermore, the possibility of using a dual detector for the determination of dopamine in the presence of ascorbic acid based on the reversible oxidation of dopamine and the irreversible oxidation of ascorbic acid was investigated. The limits of dopamine detection using reduction on the detection electrode were 0.31 μmol·dm^{-3} in the presence of ascorbic acid with a concentration of 0.1 mmol·dm^{-3}. In the presence of ascorbic acid with a concentration of 1.0 mmol·dm^{-3}, the reduction signal of dopamine decreased, and at the same time, a reduction signal was formed without its addition, which increased the detection limit of dopamine to 2.8 μmol·dm^{-3}. Part of the work was monitoring the electrochemical properties of the analytes using cyclic voltammetry.