Abstract

This bachelor thesis is aimed at degradation of the active pharmaceutical ingredient canagliflozin by the electrochemical oxidation. The aim is to explore the influence of given measurement conditions on the course and the results of the electrochemical oxidation and to find out, under which conditions the largest percentage of the degradation products is formed. These conditions are, for example, the concentrations and pH values of the buffers which are used to dissolve the samples of canagliflozin, the flow rate of the electrochemically stressed substance solution through the flow cell or the thickness of the gasket inserted in front of the working electrode.

Canagliflozin is an orally administered blood glucose lowering antidiabetic and is used to treat diabetes mellitus 2. type. It is one of the inhibitors of the sodium-glucose transporter type 2. For the separation of the degradation products of this pharmaceutically active substance, a high performance liquid chromatography (HPLC) method with a UV/VIS diode array detector using an Agilent Poroshell 120 SB-Aq chromatographic column (2.1 × 100 mm; 2.7 μm) was chosen. The mobile phase contained an aqueous component, which was 10 mM formate buffer with pH 3.5 and the organic component, which was acetonitrile.

The electrochemical oxidation of canagliflozin took place in a radial flow cell and the conditions under which the largest percentage of degradation products were formed were designed using Modde 12 statistical software. These conditions were: 100 mM phosphate buffer with pH 4.0 used to dissolve canagliflozin, 50 μm thick gasket inserted in front of the working electrode and the flow rate was 0.05 ml/h.

It has been found that canagliflozin degrade by electrochemical oxidation and form a number of degradation products. A total of 8 degradation products were formed with relative retention times of 0.48, 0.50, 0.63, 0.67, 0.89, 0.90, 1.57 and 1.58.

Key words: API, canagliflozin, electrochemical oxidation, HPLC, degradation products, degradation, stress conditions