Abstract

This diploma thesis is focused on the determination of acetylsalicylic acid using two methods of flow analysis; Flow Injection Analysis (FIA) and Sequential Injection Analysis (SIA) with spectrophotometric detection. The principle of determination is based on the acetylsalicylic acid decomposition to give salicylic ion. This ion reacts subsequently with Fe^{3+} ion in acidic solution leading to colored chelating complex $Fe(SAL)^{+}$. The increase of absorbance of this complex in its absorption maximum was used for analytical determination. Sodium salicylate (sodium salt of acetylsalicylic acid) was used as a standard substance.

In the first part of this work, experimental arrangement for flow injection analysis was setup. Continuously the optimization of experimental conditions of acetylsalicylic acid determination was performed to obtain the higher sensitivity. Under the optimal conditions the basic characteristics of determination was measured. In the second part of this work, the commercial experimental instrument FIA Lab 3500 was used for determination. Optimization of experimental conditions and basic characteristic of determination by sequential injection analysis was performed as well.

Developed methods for determination of acetylsalicylic acid with selected technique were verified by analyzing real pharmaceutical samples Acifein 250 mg, Anopyrin 400 mg and Acylpyrin 500 mg. The results of analysis of pharmaceutical samples demonstrate the suitability of this method for the determination of acetylsalicylic acid.

The basic characteristics obtained for both developed techniques and the concentration of analyzed substance in samples were expressed in mg L^{-1}concentration units. For the FIA technique the limit of detection (LOD) 0.540 mg L^{-1}, the limit of quantification (LOQ) 1.802 mg L^{-1} and repeatability (RSD) of 0.71% were achieved. For the SIA technique LOD 0.120 mg L^{-1}, LOQ 1.082 mg L^{-1} and RSD 0.72% were obtained.

Keywords

Flow injection analysis (FIA), Sequential injection analysis (SIA), Acetylsalicylic acid, Spectrophotometric detection, Pharmaceuticals