# PHARMACEUTICAL SCIENCES

## DEVELOPMENT OF MODERN NON-PHARMACOPOEIA METHODS FOR PHARMACEUTICAL ANALYSIS OF ACETYLSALICYLIC ACID (ASA)

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ASA is used as an antipyretic drug, as well as an antiplatelet agent that inhibits the aggregation of platelets and erythrocytes. It reduces the ability of platelets and erythrocytes to adhere to the endothelium of blood vessels. ASA is a common cause of accidental poisoning and the development of Reye's syndrome in children under 14 years of age [1]. Therefore, one of the urgent tasks of pharmaceutical analysis is the development of new, non-pharmacopoeial methods for the determination of ASA in the corresponding pharmaceutical compositions in order to determine in the compositions the product of hydrolysis or chemical transformations of ASA, as well as undeclared «heavy» impurities.

Methods of qualitative and quantitative ASA analysis are also used in chemical-toxicological or criminal analysis in case of human poisoning with pharmaceutical compositions containing ASA or SA [2, p. 136].

The number of ASA quality control methods is rather limited, and the quality control of such pharmaceutical compositions is not regulated by many pharmacopoeias.

For example, SPU regulates the following methods for the identification of salicylic acid (SA) as a product of ASA hydrolysis: alkaline hydrolysis with determination of the melting point of SA and reaction with ferric chloride, frying with calcium hydroxide, IR-spectroscopy [3, p. 391]. The British and European Pharmacopoeias, for the same purposes, recommend hydrolysis with sulfate acid with determination of the melting point of SA, reaction with calcium hydroxide and nitro benzaldehyde, IR-spectrophotometry and Liquid chromatography [4; 5].

Identification of acetylsalicylic acid (ASA) is possible by analyzing its hydrolysis product, as well as its active metabolite, salicylic acid (SA).

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We have developed a technique for a new non-pharmacopoeia reaction for the detection of SA (after hydrolysis of ASA); the reaction product was identified using, among other things, instrumental methods.

To develop a new non-pharmacopoeial reaction for identifying SA as a product of ASA hydrolysis, we used next reagents and equipment: 0.5% alcohol solution (70% ethyl alcohol), 0.25% solution aqueous, 0.5% solution in DMF; $CuSO_4$ 1.45% aqueous solution; UV-spectrophotometry, spectrophotometer «Agilent 8453» (range 190-1100 nm, wavelength).

It was found that SA reacts with copper salt solution to form colored SA copper (II) complexes: SA 0.5% alcohol solution (70% ethyl alcohol) – blue, 0.25% aqueous solution – blue, 0.5% DMF solution – bright green.

The results of determination of the optical density of the investigated solutions ($CuSO_4$ 1.45% aqueous solution; SA 0.5% alcohol solution (70% ethyl alcohol), 0.25% solution aqueous, 0.5% solution in DMF; solutions of colored SA copper (II) complexes) are as follows: SA complexes with Cu (II) are stable when heated, after cooling they are able to hydrolyze.

UV, nm: $\lambda_{max}$ (Cu (II) salts solutions) is not identified; $\lambda_{max}$ (SA copper (II) complexes) is from 803 to 810; $\lambda_{max}$ (SA solutions) is from 616 to 967. In the case of high optical density, the test solutions were diluted and the optical density of the resulting solution was measured.

A new non-pharmacopoeial reaction for the identification of SA (or ASA), as well as instrumental investigation of the reaction products, makes it possible to expand the list of its analysis methods both in pharmaceutical and chemical-toxicological fields.

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