SPATIAL STRUCTURE DETERMINATION OF 2-AMINO-4,7-DIARYL-3-CYANO-5,6,7,8-TETRAHYDRO-4*H*-CHROMENES

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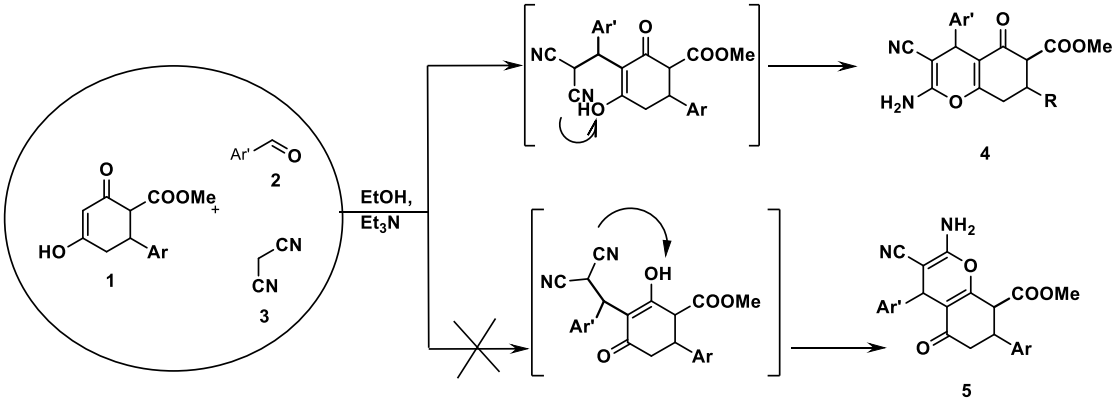
Introduction. Pyran derivatives exhibit a large variety of pharmacological activities (anti-inflammatory, antibacterial, anticoagulant, etc.) which causes the relevance of the synthesis of their new derivatives in order to find new biologically active substances.

Purpose. In the present work we show the synthesis of new derivatives of 2-amino-4H-pyran and establishing the molecular structure of the synthesized compounds.

Materials and methods. Starting compounds and reagents: arylidene acetones, dimethyl malonate, aromatic aldehydes, malononitrile, triethylamine, ethanol. The methods of organic synthesis and IR-, ^{1}H, ^{13}C NMR spectroscopy, chromatography-mass spectrometry, X-ray methods were applied in the course of the research.

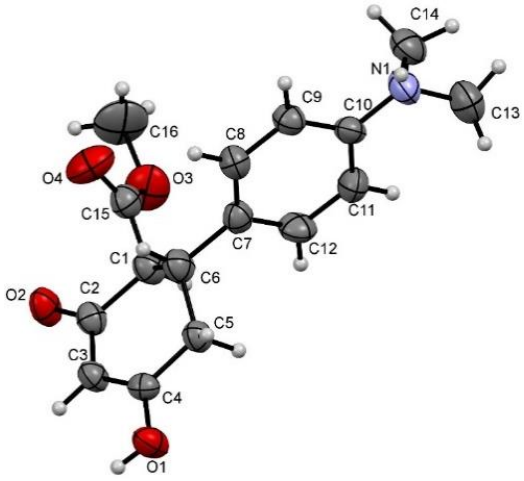
Results and discussion. The use of esters **1** as an enolnucleophile in a three-component reaction with aromatic aldehydes and malononitrile allowed us to develop a simple and efficient method for the synthesis of new carboanelated derivatives of 2-amino-4H-pyran, in particular, 2-amino-3-cyano-5,6,7,8-tetrahydro-4H-chromenes **4** with high yields from readily available reagents.



One of the most challenging tasks is to determine the composition and the spatial structure of the synthesized compounds, especially, if several stereoisomers can form during the synthesis.

Esters **1** contain two asymmetric carbons and, therefore, can exist as two pairs of enantiomers: a pair of enantiomers with a trans-arrangement of the ester group and an aryl residue and a pair of enantiomers with a cis-configuration. Analysis of 1H NMR

spectra showed that only one of the two possible pairs of enantiomers is formed, which are in the trans-configuration. Theoretically, in this three-component interaction the formation of two isomers is possible depending on oxygen atom of the ester **1** with which heterocyclization proceeds: 6-substituted **4** or 8-substituted **5**.



A search using the Cambridge Structural Database showed that X-ray diffraction studies for esters were not performed. The use of X-ray diffraction allowed to establish that the compounds in the crystalline state are in 4-hydroxy form.

Conclusions. Synthesized and determined the spatial structure of new 2-amino-3-cyano-5,6,7,8-tetrahydro-4H-chromenes. These investigations will be a base for further pharmacological researches.