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Матеріали

III Науково-практичної Інтернет-конференції з міжнародною участю

ФАРМАЦЕВТИЧНІ ТЕХНОЛОГІЇ, СТАНДАРТИЗАЦІЯ ТА ЗАБЕЗПЕЧЕННЯ ЯКОСТІ ЛІКАРСЬКИХ ЗАСОБІВ

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ONE-POT SYNTHESIS OF 2-AMINO-4,7-DIARYL-3-CYANO-6-METHOXYCARBONYL-5-OXO-5,6,7,8-TETRAHYDRO-4*H*-CHROMENES

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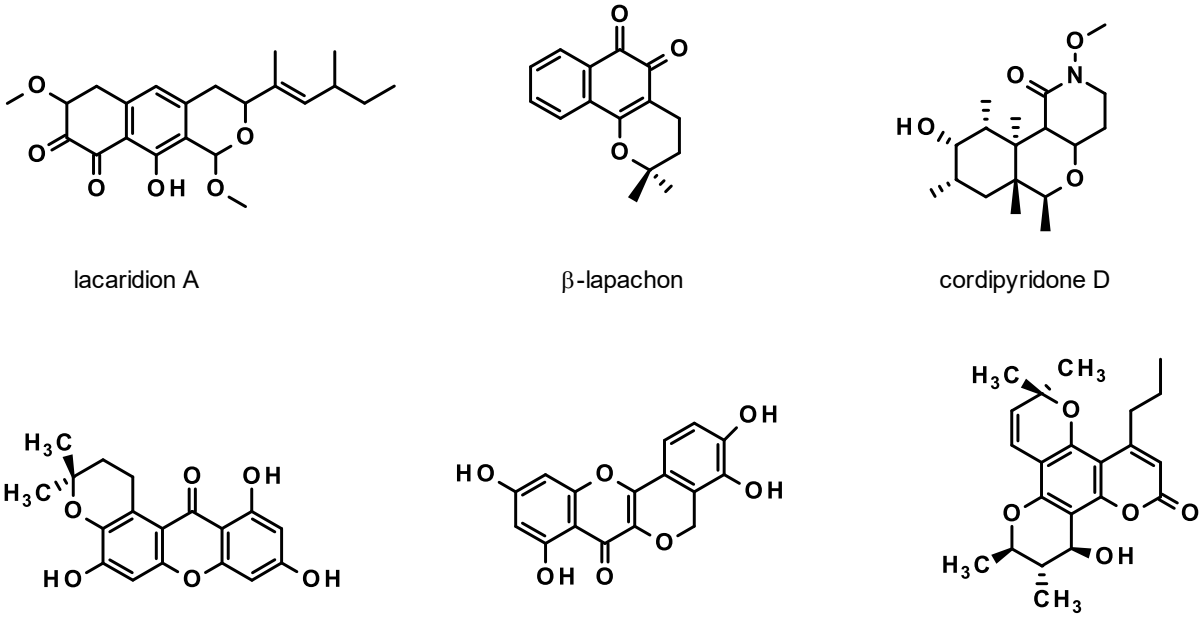
Introduction. Pyrans, of both natural and synthetic origin, represent an important class of biologically active substances. Natural derivatives of pyrans can be subdivided into those containing one, two, three, or four pyran nuclei, depending on their chemical structure.

The chemical structures of some natural pyrans are shown in Scheme 1.



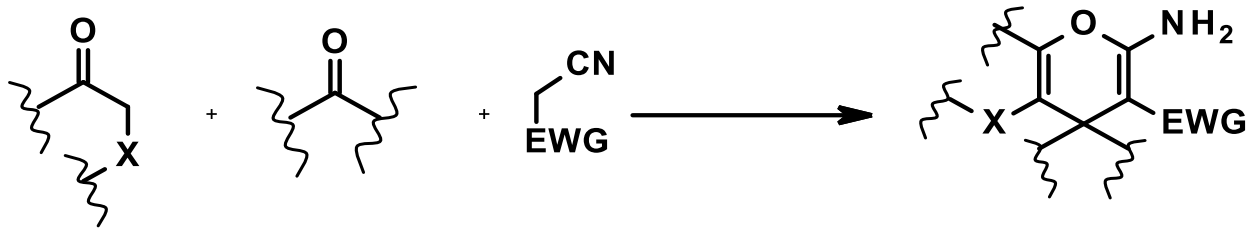
Scheme 1. The chemical structure of various natural pyrans

Synthetic pyran derivatives are used in various fields, and their spectrum of application continues to expand. Among these compounds, the 2-amino-4H-pyran derivatives represent the most studied and significant group.

Multicomponent reactions (MCRs), which involve the interaction of three or more components, are a powerful tool in modern organic synthesis.

This approach enables the formation of complex structures without the need to isolate intermediates.

MCRs between enol nucleophiles, carbonyl compounds, and active methylene nitriles are an effective method for constructing the nucleus of 2-amino-4H-pyran and its carboannulated derivatives (Scheme 2).



Scheme 2. MCR synthesis of 2-amino-4H-pyran derivatives.

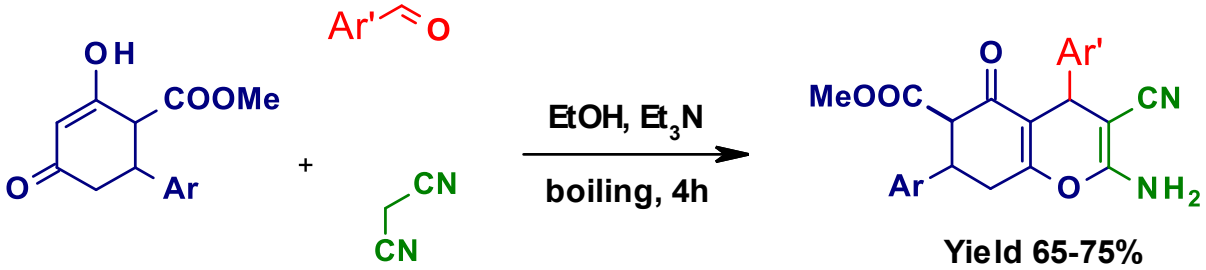
Aim of the research. The synthesis of new 2-amino-4,7-diaryl-3-cyano-5,6,7,8-tetrahydro-4H-chromene derivatives. This synthesis was carried out via a three-component reaction of 4-hydroxy-2-oxo-6-arylcyclohex-3-ene-1-carboxylate esters with aryl aldehydes and malononitrile.

Materials and methods. In the synthesis of the 2-amino-4H-pyran derivatives, 4-hydroxy-2-oxo-6-R-cyclohex-3-ene-1-carboxylate esters were utilized as the enol nucleophile. To the best of our knowledge, this is the first report on using esters containing aryl substituents in such a three-component reaction.

The target 2-amino-3-cyano-5,6,7,8-tetrahydro-4H-chromenes were synthesized by treating the starting esters with aromatic aldehydes and malononitrile in the presence of a few drops of triethylamine (Scheme 3).

Although the formation of a crystalline precipitate was observed after 20 minutes, the suspension was heated for 4 hours to ensure complete reaction.

The structures of the synthesized compounds were elucidated using IR, ^{1}H, and ^{13}C NMR spectroscopy, alongside single-crystal X-ray diffraction analysis.



Scheme 3. The synthesis of 2-amino-3-cyano-5,6,7,8-tetrahydro-4H-chromenes

Conclusions.

A simple, one-step method for the synthesis of new 2-amino-4H-pyran derivatives has been developed.

The proposed synthetic approach is efficient, providing the target products in high yields and purity.

The synthesized compounds are of potential interest for further biological evaluation due to their structural similarity to naturally occurring pyran derivatives.