Full Paper _____ *Thematic Section:* Preparative Research.
The Reference Object Identifier – ROI: jbc-01/20-63-9-26 *Subsection:* Organic Chemistry.
The Digital Object Identifier – DOI: 10.37952/ROI-jbc-01/20-63-9-26
Submitted on September 29, 2020.

Synthesis of 5-aryl-3-hydroxy-1-(2-hydroxypropyl)-4-(furyl-2-carbonyl)-3-pyrrolin-2-ones and 5-aryl-3-hydroxy-1-(3-hydroxypropyl)-4-(furyl-2-carbonyl)-3-pyrrolin-2-ones

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Keywords: 5-aryl-3-hydroxy-1-(2-hydroxypropyl)-4-(furyl-2-carbonyl)-3-pyrrolin-2-ones, 5-aryl-3-hydroxy-1-(3-hydroxypropyl)-4-(furyl-2-carbonyl)-3-pyrrolin-2-ones, synthesis.

Abstract

In this work, pyrrolidin-2-ones and their derivatives are considered as a promising class of non-aromatic heterocyclic compounds. Their structure is found in the nuclei of many natural products and biologically active molecules. In pharmacy the possibility of introducing various substituents into the nucleus of pyrrolidin-2-ones is a great importance for the synthesis of new medicinal molecules with improved biological activity. Nowadays the synthesis of new active compounds by introducing various substituents at the C1-, C4- and C5-position of 3-hydroxy-3-pyrrolin-2-one has been little studied and it is of great interest to study the conditions of their synthesis, chemical properties and biological activity. In this research work the corresponding 5-aryl-3-hydroxy-1-(2-hydroxypropyl)-4-(furyl-2-carbonyl)-3-pyrrolin-2-ones and 5-aryl-3-hydroxy-1-(3-hydroxypropyl)-4-(furyl-2-carbonyl)-3-pyrrolin-2-ones were synthesized by the reaction of methyl ester of furyl-2-carbonylpyruvic acid with a mixture of aromatic aldehyde and 1-amino-2-hydroxypropane or 3-amino 1-hydroxypropane when heated in dioxane. The results of the study of the structure of the new synthesized compounds are presented. The structure was proved using ^{1}H NMR spectroscopy and IR spectrometry. It was shown that the IR spectra of the compounds contain bands of the corresponding stretching vibrations of the alcoholic hydroxyl group, enol hydroxyl, amide and ketone groups. In the ^{1}H NMR spectra of the compounds, along with the signals of aromatic protons in the C5 substituent and related groups, characteristic peaks are observed, indicating the formation of the corresponding derivatives of 3-hydroxy-3-pyrrolin-2-ones. It was noted that in the case of the synthesis of 5-aryl-3-hydroxy-1-(2-hydroxypropyl)-4-(furyl-2-carbonyl)-3-pyrrolin-2-ones, the signal of the methine proton at the C5 position of the heterocycle is cleaved in ^{1}H NMR spectra compounds as a result of the appearance of a second chiral center in the 2-hydroxypropyl radical. Elemental analysis was performed for the synthesized compounds.

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