Diethyl oxalacetate sodium salt as a reagent to obtain functionalized spiro[indoline-3,4'-pyrano[2,3-*c*]pyrazoles]

Vladimir L. Gein, Tatiana M. Zamaraeva, Pavel A. Slepukhin

PII: S0040-4039(16)31608-2
DOI: http://dx.doi.org/10.1016/j.tetlet.2016.11.117
Reference: TETL 48403

To appear in: *Tetrahedron Letters*

Received Date: 27 September 2016
Revised Date: 24 November 2016
Accepted Date: 28 November 2016

Please cite this article as: Gein, V.L., Zamaraeva, T.M., Slepukhin, P.A., Diethyl oxalacetate sodium salt as a reagent to obtain functionalized spiro[indoline-3,4'-pyrano[2,3-*c*]pyrazoles], *Tetrahedron Letters* (2016), doi: http://dx.doi.org/10.1016/j.tetlet.2016.11.117

Diethyl oxalacetate sodium salt as a reagent to obtain functionalized spiro[indoline-3,4'-pyrano[2,3-*c*]pyrazoles]

Vladimir L. Gein[a], Tatiana M. Zamaraeva[a], Pavel A. Slepukhin[b,c]

[a] *Perm Pharmaceutical Academy, Perm, Polevaya Street, 2, Russia,*

e-mail: geinvl48@mail.ru, phone 8(342)2825830

[b]*Institute of Organic synthesis Ural Branch of Russian Academy of Science, Ekaterinburg, Sofya Kovalevskaya Street 22/20,* Russia

[c]*Ural Federal University, 19 Mira Street, 620002 Ekaterinburg, Russia*

Abstract: An efficient one-pot procedure for the synthesis of ethyl 6'-amino-5'-cyano-2-oxo-2'*H*-spiro[indoline-3,4'-pyrano[2,3-*c*]pyrazole]-3'-carboxylates in moderate to high yields is described.

Keywords: One-pot reaction, diethyl oxalacetate sodium salt, isatin, malononitrile, hydrazine hydrate, spiro[indoline-3,4'-pyrano[2,3-*c*]pyrazole].

The application of one-pot reactions to the synthesis of heterocyclic compounds is highly desirable due to their high efficiency, experimental simplicity, accessibility of reagents and wide diversity of the obtained products.[1-10]

Pyranopyrazoles and their derivatives are an important class of heterocyclic compounds possessing important biological activities such as anti-inflamatory,[11] antimicrobial,[12] antifungal,[13] insecticidal,[14] anti-tumor and anti-cancer[15,16] properties. Additionally, some compounds have found applications in agriculture.[17] Thus, the synthesis of heterocyclic compounds containing the pyran and pyrazole rings is of great importance.

Isatin is frequently used to generate potential pharmacological agents, such as spirooxindole derivatives,[18] which exhibit a wide range of biological properties and are therefore of interest in organic and medicinal chemistry.[19,20] Thus, the development of new synthetic strategies for the construction of functionalized spirooxindoles using multicomponent reactions is still of interest.

It has been reported that spiro[indoline-3,4'-pyrano[2,3-*c*]pyrazole] derivatives containing a methyl group in the 3-position of the pyrazole ring could be synthesized in one-pot reactions from hydrazine hydrate, isatin derivatives, malononitrile and β-keto esters.[21,22,23.] Spiro[indoline-3,4'-pyrano[2,3-*c*]pyrazole] derivatives with alkyl (methyl-, ethyl-, propyl-, isopropyl) fragments in the 3-position of the pyrazole ring were also obtained by the one-pot, three-component reactions of isatins, malononitrile (or ethyl cyanoacetate) and 5-pyrazolone derivatives in EtOH