

**-NITRO- AND 2-BROMO-2-NITROETHENYLPHOSPHONATES IN REACTIONS
WITH ALKYLDIAZOACETIC ESTERS**

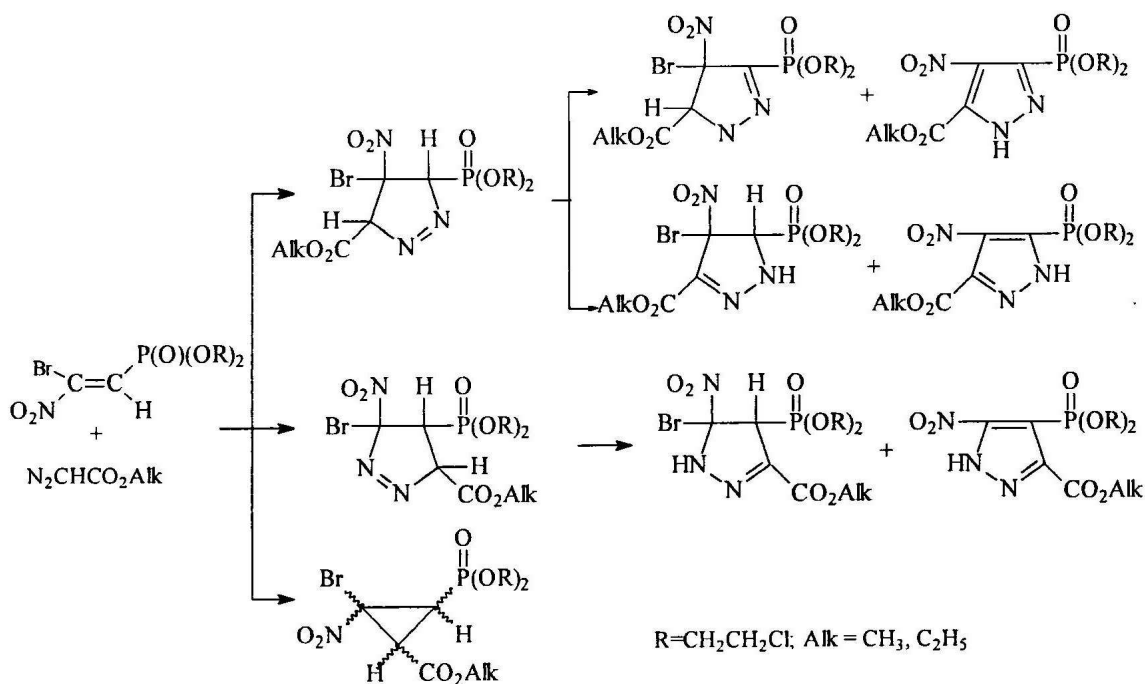
N.A. Anisimova, N.G. Makarova, L.I. Deiko, V.M. Berestovitskaya

*Alexander Herzen State Pedagogical University of Russia,
Moika emb. 48; St. Petersburg 191186, Russia; e-mail: kohrgpu@yandex.ru*

1,3-Dipolar cycloaddition reactions represent a great interest as objects of both theoretical and applied research. This class of reactions has been used extensively in synthesis of a wide range of five-member heterocyclic compounds with significant biological activities and potential synthetic applications. Among these compounds there are a lot of natural substances and their analogs.

We have been investigating the reactions of 2-nitro- and 2-bromo-2-nitroethenylphosphonates with alkyldiazoacetic esters during recent years. It was found that the introduction of nitrogroup (or halogen and nitrogroup) in α -position to ethenyl (vinyl) phosphonates stimulates the process of cycloaddition in two directions to form two regio-isomeric Δ^1 -pyrazolines. The electron withdrawing substituents in latters promote their ability to undergo intermolecular transformations. Thus, Δ^1 -pyrazoline derivatives give rise to prototropic isomerization leading to tautomeric Δ^2 -pyrazolines, as well as their dehydrobromination (or elimination of nitrous acid) leads to formation of regioisomers and tautomers of pyrazols or nitropyrazols. Along with these compounds nitrocyclopropylphosphonates are also obtained.

The interaction of 2-bromo-2-nitroethenylphosphonates with alkyldiazoacetates can be illustrated by the following scheme.



In this case the main products are phosphorylated nitropyrazoles and nitrocyclopropanes. The structures of the synthesized compounds were determined by IR, ¹H, ³¹P NMR spectroscopy.