

Synthesis of 4,6-disubstituted bicyclo[3.3.1]nona-3,6-dien-2-ones

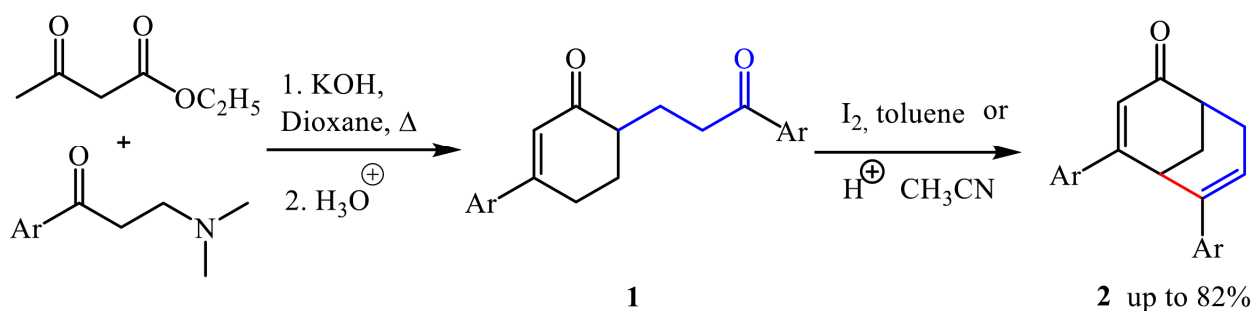
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Bicyclo[3.3.1]nonane is a fundamental structural unit in a variety of biologically active natural products as well as synthetic materials. Investigation of various synthetic methods for construction bicyclo[3.3.1]nonane ring system has now become an important goal for many research groups and many synthetic pathways have been described [1-3]. Despite the above-mentioned efforts, a simple synthetic route which would drastically accelerate assembly of bicyclo[3.3.1]nonane ring system is still in high demand.

We focused our attention on the C–C bond formation using aldol condensation reaction to access complex bicyclo[3.3.1]nonane scaffolds in short order. Our strategy is to employ cyclohex-2-enones **1** bearing another carbonyl group in side chain as substrates. Key cyclohex-2-enones **1** can be prepared by condensation of the corresponding Mannich bases with acetoacetic ester in basic conditions. After extensive experimentation, we found that heating enones **1** with iodine led to the formation of 4,6-disubstituted bicyclo[3.3.1]nona-3,6-dien-2-ones **2**. Acid-catalysed procedure was also suitable for described transformation. Several inorganic and organic acids were tested and the best results were obtained when sulfuric or perchloric acids were used as a catalyst.



The reaction showed good results for substrates bearing electron-donating groups in aromatic substituents. Overall, the described synthesis of bicyclo[3.3.1]nona-3,6-dien-2-ones required 2 steps and only 2 building blocks (such as Mannich base and acetoacetic ester) to access desired bicyclic system.

Литература

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