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DBU promoted multi-component domino reactions for Synthesis of benzofurans in water

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ABSTRACT

An efficient three-component strategy for the preparation of fused 2,3-dihydrofuran derivatives was developed with the assistance of *N*-heterocyclic compound ylide. The synthesis was achieved by reacting phenacyl bromides, *N*-heterocycles, aromatic aldehydes and cyclic 1,3-dicarbonyl compounds in the presence of a catalytic amount of DBU(1,8-Diazabicyclo(5.4.0)undec-7-ene) as an inexpensive, impressive and readily available catalyst in water under reflux. This strategy provides a rapid and efficient methodology for the preparation of benzofurans in excellent chemo-, regio- and stereoselectivities. This protocol has the advantages of convenient one-pot operation, short reaction times, high isolated yields of the pure products, easy work-up and avoidance of hazardous or toxic catalysts and organic solvents. Furthermore, it can be considered as environmentally friendly.

Keywords: Multicomponent domino reactions (MDRs), One-pot synthesis, Benzofuran, DBU

1. INTRODUCTION

Recently, considerable attention has been paid to the multi-component reactions (MCRs) which led to the synthesis of heterocycles [1]. Accordingly, many procedures have been developed for the application of MCRs to providing nitrogen-containing heterocycles [2]. Of these heterocycles, the benzophoran ring is one of the most fundamental. It is a widely biological activities including antimalarial, antitumor, anthelmintic, antibacterial, antiasthmatic, and antiplatelet [3-5]. Benzofuran core is a highly versatile and of great medicinal interest due to its presence in many natural products. Naturally benzofuran derivatives can be isolated from various medicinal plants and marine products; alongside it can be obtained from bacterial or fungal metabolites. Benzofuran can be part of small molecule like Benzofury[6], as well as complex drug molecule morphine and macromolecule like Rifamycin[7].

Therefore, considering the importance of benzofuran derivatives and and in continuation of our ongoing program for the synthesis of heterocyclic compounds, herein, we report the preparation of polyfunctionalized benzofuran derivatives **6** through a domino, one-pot, multi-component condensation reaction between phenacyl bromides **1**, *N*-heterocycles **2**, aromatic aldehydes **4** and cyclic 1,3-dicarbonyl compounds **5** in the presence of DBU as a high reactive, non-toxic and easy to handle catalyst in water under reflux conditions (Scheme 1).