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Proceeding Paper

One-Pot Synthesis of New Imidazole Derivatives †

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Abstract: Imidazole are one of the important classes of heterocyclic compounds because of their wide utilities, these molecules are an amphoteric witch can react in the both as an acid and as a base. Imidazole derivatives exhibit a wide range of biological and pharmacological activities including anti-fungal, anti-bacterial, anti-depressant, anti-cancer, anti-viral. Due to their characteristic properties. Many methodologies have been developed for constructing imidazole rings. In this work we present the synthesis of new imidazole derivatives via One-Pot reaction and using eco-friendly conditions.

Keywords: Imidazole; Heterocycle; eco-friendly conditions; One-pot reaction

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1. Introduction

Among the most important research topics in organic chemistry around the world is heterocyclic chemistry [1]. Is the basis of many pharmaceuticals, chemicals, heterocyclic compounds exhibiting a wide range of biological and pharmacological activities [2].

Within this range imidazole derivatives represents ubiquitous scaffolds often present in both natural products and pharmaceutical compounds, imidazole is an unsaturated 5 membered heterocyclic ring consists of two nitrogen atoms, imidazole and its derivatives display a vast range of medical activities [3–6], including anti-bacterial [7], anti-fungal [8], anti-inflammatory [9], anti-viral [10], anti-parasitic [11], anti-cancer [12], anti-histaminic [13], and enzyme inhibition [14].

In this context, we present here an efficient One-Pot synthesis of new imidazole derivatives (Figure 1). This approach was developed using readily available compounds, inexpensive, and environmentally benign conditions.

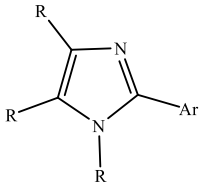
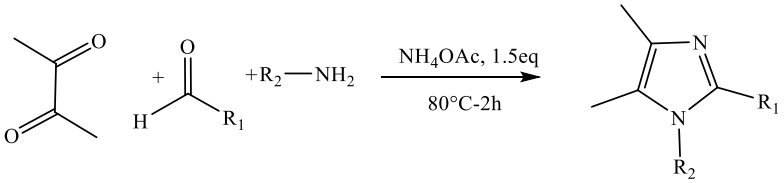


Figure 1. General structure of imidazole derivatives.

2. Results and Discussion

In the present paper, a novel and efficient procedure for the synthesis of new imidazole derivatives has been presented. We have done a lot of investigations on thesynthesis of nitrogen heterocycles via One-Pot reactions [15–20], we report here a One-Pot three component reaction in stoichiometric quantities for the synthesis of a new imidazole derivatives. This method is a process in which three easily accessible components are combined in a single reaction to give the desired product. Initially, a model reaction was conducted using 2,3-butanedione, benzaldehyde and propylamine in the presence of ammonium acetate at 80 °C for two hours (Table1).The structure of the synthesized productis confirmed by NMR, IR, and MS analyses.

Table 1. Optimization of conditions.



R_1	R_2	Yield(%)
C_6H_5-	$CH_3(CH_2)$-	76

In order to evaluate the generality of this model reaction, we were encouraged toextend this reaction to a variety of primary amines, so we have examined this reactionemployingtheoptimizedconditions.Asaresult,wefoundthatusingthetemperature at 80 °C gives moderate to good yields (Table 2).

Table 2. Synthesis of new imidazole derivatives.

R_1	R_2	Yield(%)
C_6H_5-	$CH_3(CH_2)_2$-	76
	$C_6H_5CH_2$-	70
	HO-$(CH_2)_2$-	55
	C_6H_5-	64

3. Experimental Procedure

General procedure for the synthesis of imidazole derivatives: A mixture of 2,3- butanedione (10 mmol), benzaldehyde(10 mmol), primary amines(10 mmol) in the presence of ammonium acetate (1.5 eq) was heated for 2 h at 80 °C. After cooling, the solid obtained was washed several times with diethylether togive imidazole drivatives.

4. Conclusions

We have developed an efficient synthesis of imidazole derivatives with good yields via One-pot reaction. The compounds structure is confirmed by spectral analysis. This approach includes some advantages such as mild reaction conditions and environmentally benign conditions.

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