

A straightforward synthesis of imidazoisoindole-5-one via one-pot reaction of 1, 2-diketones, 2-formylbenzoic acids and ammonium acetate

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Background and Aims: Nowadays, synthesis of benzimidazole-based heterocycles has attracted a growing interest owing to their crucial biological activities. Imidazoles have exhibited remarkable biological properties. 5H-imidazo[2,1-a]isoindolo-5-one derivatives have been applied as important biologically active agents. It is worthwhile to mention that there are several papers reporting the synthesis of 2, 4, 5-triaryl-1H-imidazoles using 1, 2-diketones, aromatic aldehydes and ammonium acetate in different conditions.

Methods: Our initial efforts to obtain fused imidazo-isoindolone derivatives, involved the reaction of stoichiometric amounts of benzil, 2-formylbenzoic acid and NH₄OAc in different solvents such as ethanol, dichloromethane, acetonitrile, toluene and acetic acid at different temperatures. There was no reaction at room temperature and as expected, acetic acid was the best reaction solvent under reflux conditions. Application of ammonium acetate in acetic acid as a source of ammonia has been studied widely in the synthesis of N-heterocycles. Also it was found that an excess of ammonium acetate should be used to obtain the highest yield of product. Considering the details, the corresponding product was obtained in good yield after 5 h reflux in acetic acid in the presence of excess ammonium acetate.

Results: by replacing aldehyde by 2-formylbenzoic acid can directly lead to the formation of imidazo[2,1-a]isoindolo-5-one nucleus which undergoes further cyclization to give 2,3-diaryl-5H-imidazo[2,1-a]isoindolo-5-one derivatives

Conclusions: In conclusion, a reliable, rapid and high-yielding procedure for the synthesis of potentially bioactive 2, 3-diaryl-5H-imidazo [2, 1-a] isoindolo-5-one derivatives 4 has been reported for the first time. The products were obtained by one-pot reaction of 1, 2-diketones, 2-formyl benzoic acids and ammonium acetate in acetic acid under reflux conditions. The procedure is very simple and affords the derivatives in good yields in the absence of catalyst.

Keywords: Imidazo [2,1-a]isoindol-5-one; 1,2-diketones; Ammonium acetate