Environmentally Friendly and Facile Synthesis of 2-oxo- and Thioxo-1,2,3,4-tetrahydropyrimidines Catalyzed by Formic Acid as a Natural Green and Bio-based Catalyst under Solvent-Free Conditions

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ABSTRACT

A green synthetic route to the facile Biginelli synthesis of 2-oxo- and thioxo-1,2,3,4-tetrahydropyrimidines have been developed using formic acid as a natural green and bio-based catalyst under solvent-free reaction conditions. All reactions are completed in a short period of times and the products are obtained in high to excellent yields. The salient features of this green approach are simple work-up with no necessity of chromatographic purification steps, absence of hazardous organic solvents, use of safe, non-volatile, noncorrosive and readily green catalyst, solvent-free conditions, one-pot reaction, eco-friendly and clean synthesis.

Keywords: Formic acid, Natural green and Bio-based catalyst, 2-oxo- and Thioxo-1,2,3,4-tetrahydropyrimidines, Solvent-free conditions

INTRODUCTION

Synthesis of heterocyclic compounds has attracted great interests due to their wide applicability in life and nature. The compounds with pyrimidinone derivatives are reported as, such as calcium channel blockers, α-1a-antagonists (Prakash et al., 2008), mitotic kinesin Eg5 inhibition (Kapoor et al., 2000), anti cancer (Mal3-101) (Wisen et al., 2008), anti HIV agent (Heys et al., 2000), antibacterial and antifungal (Ashok et al., 2007), antiviral (Hurst et al., 1961), antioxidative (Magerramow et al., 2006). The representatives such as batzelladines, ptilomycalines and crambescidines exhibit many biological activities such as anticancer, antifungal, anti HIV, etc (Bewley et al., 2004).