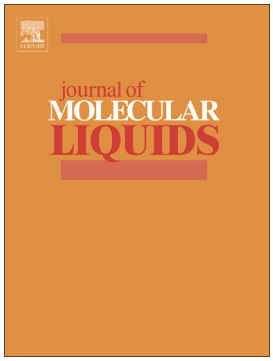

Solvent free-synthesis of highly functionalized 4H-chromene-3-carboxamide derivatives using cerium ammonium nitrate and their antioxidant, antibacterial, solvatochromism studies

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Solvent free-synthesis of highly functionalized 4*H*-chromene-3-carboxamide derivatives using cerium ammonium nitrate and their antioxidant, antibacterial, solvatochromism studies

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Abstract: A novel 4*H*-chromene-3-carboxamide derivatives were synthesized from a multicomponent reaction between 2-hydroxybenzaldehyde, acetoacetanilide, and 4-hydroxycoumarin under solvent free conditions in the presence of ceric ammonium nitrate (CAN) via Knoevenagel-Michael reaction. In this work, we attempted and developed several amendments under solvent-free conditions to obtain the biologically important 4*H*-chromene-3-carboxamides and characterized by NMR, HR-MS and UV-Vis spectroscopy analysis. The solvatochromic properties of compounds **4a-l** was studied with solvents of increasing order of polarity. A series of 4*H*-chromene-3-carboxamides **4**(**a-l**) and their antibacterial activities against Gram positive and Gram negative organisms was investigated using agar well technique. In the *in vitro* assay, the compounds **4k** and **4l** (9.3 µg/mL) showed promising antibacterial activity compared to ampicillin (standard). The compounds **4**(**a-l**) were studied for their *in vitro* antioxidant (DPPH method) activity, **4d**, **4h**, **4k**, and **4l** compounds showed strong antioxidant activity with IC_{50} values of 1.39, 1.33, 1.26 and 1.10 µg/mL when compared to ascorbic acid (standard).

***Key words**:* Ceric ammonium nitrate; One pot synthesis; Solvent-free reaction; 4-hydroxycoumarin; 4*H*-Chromenes.

1. Introduction

The elaboration of new organic reactions to construct novel chemical entities for the synthesis of diverse molecular frameworks is important in the field of chemistry as well as in biological applications [1-5]. 4*H*-chromene and its derivatives are important class of heterocyclic compounds extensively delivered in many natural occurring compounds [6]. Moreover, 4*H*-chromene derivatives also exhibit a wide spectrum of biological activities such as antioxidant [7], anti-inflammatory [8], antibacterial [9], antileishmanial [10], antifungal [11], antiproliferation [12], anticoagulant [13], and antitumor [14] agents. Particularly HA-14 and Crolibulin EPC2407 were showing strong cytotoxicity against human cancer cells [15, 16]. Coumarins and its