Indian Journal of Chemistry
Vol. 58B, November 2019, pp. 1252-1256



# Synthesis of 4-{[(4'-methyl-coumarin-7'-yl)amino]methyl}-coumarin derivatives

K Mahesh Kumar*[a,b], O Kotresh[a], S P Ambekar[a], A M Shirahatti[a], N M Mahabaleshwaraiah[c] & C M Masuku[b]

[a] Department of Chemistry, Karnatak Science College, Dharwad 580 001, India
[b] Department of Civil and Chemical Engineering, University of South Africa, Johannesburg 1710, South Africa
[c] Department of Chemistry, P C Jabin Science College, Hubballi 580 031, India
E-mail: mahesha.001@gmail.com

*Received 31 May 2018; accepted (revised) 23 April 2019*

An efficient and simple method has been developed for the synthesis of 4-arylaminomethyl coumarins by the condensation of 7-amino-4-methylcoumarin to 4-bromomethylcoumarins. The advantages of this procedure are mild reaction conditions, high yields of products, and operational simplicity.

**Keywords**: 4-Bromomethylcoumarins, 7-amino-4-methylcoumarin, 4-{[(4'-methyl-coumarin-7-yl)amino]methyl}-coumarin

The coumarin unit is the key building bioactive heterocyclic block for a variety of compounds, which have crucial roles in the functions of biologically important moleculesboth with respect to their inhibitory activity and their favorable selectivity ratio. Coumarin derivatives have a wide range of well-known pharmacological activities against various antimicrobial strains[1]. This heterocyclic ring system is present in numerous anti-cancer[2], anti-HIV[3], antioxidant[4], anthelmintic[5], anticonvulsant[6], antitumorial[6], anti-inflammatory[7], antiviral[8], anticoagulant[8], anti-neoplastic[9], anti-malarial[10], diuretic[11], cardiovascular[12] agents. Their applications range from additives in food, perfumes, cosmetics, pharmaceuticals and in the preparation of insecticides[13], optical brighteners[14] and dispersed fluorescent and tunable laser dyes[15]. The natural occurrence, antimicrobial, anti-inflammatory, anticancer, and other properties of different coumarins have been recently reviewed[16].

Many coumarin derivatives are known for their ability to scavenge free radicals, especially reactive oxygen species (ROS), and they have been used as inhibitors of cyclooxygenase and lipoxygenase in the arachidonic acid pathway of inflammation suppression[17]. Coumarins are well known fluorophores with high quantum yields, high photostability and derivatizable backbone. There have been many excellent coumarin-based fluorescent probes reported for $Cu^{2+}$ during the latest decade[18-21]. They are serving as important synthetic precursors of furocoumarins and dihydrofurocoumarins, which are widely used as photosensitizers and chemotherapeutic agents to combat skin diseases[22].

Due to the importance of coumarin derivatives and amino substituted derivatives several investigators have been investigating various compounds bearing single substituent or more complicated substituent in heterocyclic ring system mainly in 3-, 4- and/or 7-position[23]. Coumarins are widely used as leaving groups in fluorogenic assays of enzyme activities. Indeed, substitution of position 7 by either a hydroxyl or an amino group does not affect the fluorescence of the coumarin and allows it to be coupled through ester or amide bonds to a variety of compounds (*e.g.*, sugars and amino acids). The fluorescence of such conjugated coumarins is strongly diminished but can be fully restored by freeing position 7 through the action of enzymes such as esterases or amidases[24-26] 7-substituted coumarins constitute an important group of compounds that show various bioactivities along with other applications[27]. Moreover, 7-amino 4-methyl coumarin is also used as laser dye and intermediate for the synthesis of bioactive compounds[28] and the 4-methylcoumarin derivatives present in various naturally occurring compounds, are known to exhibit a wide range of biological and pharmaceutical activities[29].

The last decade witnessed a series of publications on the development of synthetic protocols for this important heterocyclic scaffold. Taking into account of the wide pharmacological activities of coumarin derivatives and basing on analyzing of the structure of