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Emerging Trends and Innovative Practices in Teaching Chemistry



Guest Editor

Dr. R. P. Bhamare

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Synthesis and Pharmacological Evaluation of New Bipyridinyl Substituted Quinoline Derivatives

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Abstract

In the present study three series of novel bipyridinyl derivatives containing substituted quinoline moiety (1a-d, 2a-d, 3a-d) were synthesized. The first series were synthesized by the reaction of 5-methoxy quinoline 6-acetyl pyridinium bromide salt (f) with substituted derivatives of (E)-1-phenyl-3-(pyridine-4-yl)pro-2-en-1-one (1a'-d') and the second and the third series by the reaction with substituted (E)-1-phenyl-3-(pyridine-3-yl)pro-2-en-1-one (2a'-d') and (E)-1-phenyl-3-(pyridine-2-yl)pro-2-en-1-one (3a'-d') using Kricheldorf's reaction. Structures of newly synthesized compounds were characterized by spectral studies. New compounds were screened for antimicrobial activities. Among the synthesized compounds, compound 1d was found to be excellent potent antimicrobial agent.

Key Words: Quinoline, Bipyridine, Antimicrobial studies.

Introduction :

Nitrogen containing heterocyclic compound quinoline in medicinal chemistry is not new but still some heterocyclic ring system in combination with quinoline ring system shows very good activity profile [1-4]. Various quinoline derivatives have been synthesized by many routes in the search of therapeutic agents [5-7]. Quinoline derivatives have been shown various activities like cytotoxic, anti-inflammatory and antifungal [8-9]. Large number of bipyridines and substituted bipyridines are widely used in the complexation of inorganic metal ions [8-11]. Their use as ligands in coordination and supramolecular chemistry is also reported in literature [12]. The transition metal complexes of bipyridines are reported to have important applications like photocatalysis [13], chemoenzymes [14] and luminescent probes for biomolecular systems [15]. In addition to their use as ligands in metal complexes, the bipyridines are also reported to have other interesting applications. Some of the bipyridines are used as building blocks for the construction of efficient molecular and macromolecular nonlinear optical (NLO) chromophores [16]. Certain bipyridines are also reported to have important medicinal applications, e.g. 5-aryl-2, 2'-bipyridines are reported to have a strong fungicidal activity against different plant diseases [17]. Certain bipyridine derivatives are used as cardiotoxic drugs [18].

Prompted by these observation and in continuation of our interest in synthesizing novel modified bipyridinyl substituted quinoline derivatives, The bipyridinyl nucleus incorporated in quinoline moiety as a substituent group and therefore in the present work, various bipyridinyl substituted quinoline derivatives have been synthesized, characterized and evaluate an antimicrobial activity against various microbial strains.

Materials and Methods

All chemicals were purchased from Sigma-Aldrich, Germany. Melting points were determined by the open capillary method and were uncorrected. FTIR spectra of the synthesized compounds were