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RESEARCH ARTICLE

Synthesis, Structural Characterization, Catalytic, Biological and α-Glucosidase Inhibitory Studies of Metal Complexes with Flavone Derivatives

R.R. Krishna Jyothi[1] • Sharow Geeth Vincent[2] • J. Joseph[3*]

[1]*Department of Chemistry, Noorul Islam Centre for Higher Education, Kumaracoil, Tamil Nadu, India.*

[2]*Department of Chemistry, Noorul Islam Centre for Higher Education, Kumaracoil, Tamil Nadu, India.*

[3*]*Department of Chemistry, Noorul Islam Centre for Higher Education, Kumaracoil, Tamil Nadu, India.*

E-mail: josephniche@gmail.com

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ABSTRACT

Heterocyclic compounds, in particular oxygen-containing heterocyclic compounds, are of special interest to medicinal chemists because of their unusual biological properties. In the present study, the highly conjugated nitrogen heterocyclic scaffold comprised of flavone derivative with metal acetates to form metal chelates of the type $[M^{II}L(OAc)_2]$, flavone analogues (L); M=Co^{2+}, Zn^{2+}, Cu^{2+} and Ni^{2+}. The above title compounds were characterized using composition analysis of CHN and spectroscopic techniques. Based on spectroscopic and analytical measurements confirmed that square planar arrangements for the Co^{2+}, Zn^{2+}, Cu^{2+} and Ni^{2+} complexes. Antimicrobial efficacy of prepared complexes were assessed against *A.flavus*, *A.niger*, *B.subtilis*, *E. coli*, *C. albicans* and *S.aureus*. The anti-mycobacterial ($H_{37}Rv$) efficacy of flavone analogues and its complexes were screened using MABA approach and compared with standard. The acetylcholinesterase (AChE) inhibitory effect of the ligand was examined to find out the therapeutic efficiency of compound in the treatment of neurodegenerative disorders. The synthesized ligand exhibited selective inhibition (AChE & BuChe) values (IC_{50} : 0.20 (flavone analogue), 2.41 (Rivastigmine) and 3.01 μM (Galantamine), respectively. Further, the in vitro anti-inflammatory efficiency of metal chelates were performed with the help of egg albumin method. The α-glucosidase inhibition activity was also carried out for the prepared metal complexes.

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Introduction

The emergence of multidrug resistant pathogens exposed the emerging need for novel antimicrobial agents with multi target interactions. The acetylcholine (neurotransmitter) is essential for the treatment of memory and learning in neurodegenerative disease, and the lower level of patients with Alzheimer's disease (AD).

Acetylcholinesterase (AChE) as a neurotransmitter which modulates the acetylcholine and other esters of choline and terminates essential brain functions [Cheung J, Rudolph MJ, Burshteyn F, 2012]. It plays an imperative action in the formation of fibrils through the aggregation of amyloids [Sonmez F, Zengin Kurt B, Gazioglu I, 2017; Tripathi RKP, M Sasi V, Gupta SK, 2018; Soyer Z, Uysal S, Parlar S, 2017; Ali AE, Elasala GS and Ibrahim RS, 2019]. The primary therapeutic strategies for anti-AD to reduce the speed of denaturation of

* Corresponding author: josephniche@gmail.com