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Synthesis, Characterization, and Antibacterial Evaluation of Some New Transition Metal Complexes of *N'1,N'3*-Bis((*E*)-1-(4-Hydroxy-6-Methyl-2-Oxo-2*H*-Pyran-3-yl)Propylidene)Malonohydrazide

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ABSTRACT Five new metal complexes have been prepared by treating *N'1,N'3*-bis((E)-1-(4-hydroxy-6-methyl-2-oxo-2*H*-pyran-3-yl)propylidene)malonohydrazide with transition metals of 3d-series. The ligand required for this purpose was prepared by the reacting 3-propionyl-4-hydroxy-6-methyl-2*H*-pyran-2-one (DHAP, an analog of dehydroacetic acid) with malonyl hydrazide. The synthesized ligand and metal complexes were characterized by spectral and elemental analytical data. The prepared complexes were also screened for their antibacterial effects against Gram-positive and Gram-negative bacteria using ampicillin as a reference drug. It is envisioned that further structural modifications in ligand might lead to some potent antibacterial drug in future.

KEYWORDS Antibacterial activity, Dehydroacetic acid, DHAP, Schiff base, Tetradentate.

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INTRODUCTION

The study of Schiff bases is of utmost importance due to their property to form complexes which have been known to have a wide range of pharmacological applications.[1] The biological activities of hydrazones are due to the availability of the -CO-NH-N=C- group.[2-5] These groups known to have vast biological profile such as anti-microbial,[6] anti-fungal,[9] antibacterial,[7,8] anti-cancer,[10] and anti-anthelmintic[11] activities. Schiff base ligands have been frequently employed in analytical chemistry because of their ability to interact with a variety of metals. These are utilized to detect various metal ions in different liquids as sensing materials.[12] The derivatives of dehydroacetic acid have recently been shown to have promising fungicidal and bactericidal properties.[13-16] Several Schiff bases and their metal complexes have been prepared from the combination of heterocyclic Schiff base of dehydroacetic acid with different metals of 3d-series.[17] These metal complexes were tested against their antibacterial activity.[18]The aim of present study is to synthesize some new hydrazide Schiff base metal complexes by the combination of *N'1,N'3*-bis((*E*)-1-(4-hydroxy-6-methyl-2-oxo-2*H*-pyran-3-yl) propylidene)malonohydrazide (a hydrazide Schiff base ligand, abbreviated as LD) with transition metal of 3d-series. The synthesized metal complexes were screened for their antibacterial effect with intend to develop promising antibacterial drugs in future.

RESULTS AND DISCUSSION

Chemistry

Five transition metal complexes were prepared by the combination of ligand LD with transition metals of 3d-series. The ligand LD, needed for this work, was synthesized by treating 3-propionyl-4-hydroxy-6-methyl-2*H*-pyran-2-one

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ligand. The ligand and its metal complexes were found to be less effective against tested bacterial strains when compared to the reference drug. It is envisaged that structural modifications of ligand might lead to effective antibacterial agent in curing other life-threatening diseases in future.

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