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Heterocyclic compounds containing thiazole ring as important material in medicinal chemistry

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ABSTRACT

Thiazoles are among the most important heterocyclic compounds that contain sulphur at positions 1 and nitrogen at positions 3 in a 5-membered ring. Thiazoles possess an excellent biological activity because of the presence of N and S atoms. These heteroatoms play an important role in the coordination chemistry and bind at active sites of the metal ions which increase their therapeutic activity. Many natural products possess the thiazole ring structure, which has sulphur and nitrogen heteroatoms. Thiamine (vitamin B1) is the most important naturally occurring thiazole derivative in which both pyrimidine and thiazole rings are present. In the present research work, derivatives of 2-amino thiazol have been synthesized. These ligands were further reacted with Cu salts to synthesise metal complexes. Many of the researchers are interested in the thiazole derivatives and their complexes because of their application as good biological active compounds in antibacterial, antifungal, and antioxidant activity.

Selection and peer-review under responsibility of the scientific committee of the International Conference on Design and Applications of Multifunctional Materials, Interfaces and Composites.

1. Introduction

Coordination chemistry is always been important for chemists and biologists. Even after a century, for the discovery of new coordination compounds, Schiff bases play a significant role as an important moiety for coordination and binding with metal ions [1]. Schiff bases which are synthesized by the condensation reaction of aromatic/aliphatic aldehydes/ketones with amines and complexed with many transition metal ions are still of great interest in inorganic chemistry. Thiazole is a five membered heterocycle ring. Thiazole based Schiff base ligands and their metal complexes have been comprehensively studied for their remarkable chemical properties and applications in various areas such as pharmaceutical, biomedical, waste water treatment, paint industries, agriculture and many more [2]. They are applicable in the fields of inorganic chemistry, environmental and industrial chemistry. Their synthetic and biological applications have been intensively explored throughout the decades. The first synthesis of thiazole was discovered by a German scientist named Hantzsch in 1887. This is the most common methods for the synthesis of thiazoles. In the recent paper reseach the synthesis of thiazole has been derived from the Hantzsch Method. The substitution of hydrogen atoms with desirable moieties at positions 2, 4 and 5 dominates the structural pattern of thiazole derivatives as active molecules. These compounds and their derivatives have been found to possess anti-inflammatory, antifungal, anticancer, antibacterial, anticonvulsant, antiviral, and antitumor properties [3–4]. Sulfathiazole was one of the first commercially available synthetic drug to contain thiazole which is obtained from 2-aminothiazole. Currently, thiazole derivatives are included in various commercial items. Numerous cyanine dyes made from thiazolylium and benzothiazolylium salt have been synthesized and used as sensitising dyes and in silver photography. Due to high thermal stability of the thiazole nucleus which encouraged the synthesis of polymers incorporating this structure that have good thermal stability. Thiazole derivatives can be used as a inhibitors of phosphatidylinositol-3-kinases (P13Ks)Figs. 1,2. They can be used in proliferative, inflammatory and cardiovascular disorders. Novartis have discovered Compound 1 and 2 in 2011 and 2012 (see Fig. 7)

These compounds have pharmacological activities. In 2008 Goff et al. have discovered the new class of diaminothiazoles which are used as inhibitors of protein kinases. In 2009 Abbott Laboratories

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