Literature Review

The compounds containing azomethine (-C=N-) group are known as Schiff bases, are formed by the condensation of a primary amines with a carbonyl compounds such as aldehydes or ketones. The Schiff bases of aliphatic aldehydes are relatively unstable and are radialy undergoes polymerization while those of aromatic aldehydes having an effective conjugation system are more stable. Schiff bases are plays very important role in many biological and chemical reactions; because of the imine linkage. Schiff bases are generally bi- or tri- dentate ligands capable of forming very stable complexes with transition metals[1].

A large number of Schiff bases and their complexes have been studied for their interesting and important properties, e.g., their ability to reversibly bind oxygen1, catalytic activity in hydrogenation of olefins and transfer of an amino group, photochromic properties, and complexing ability towards some toxic metals. The high affinity for the chelation of the Schiff bases towards the transition metal ions is utilized in preparing their solid complexes. Schiff base derived from the reaction of 2,5-thiophenedicarboxaldehyde and o-amino-benzenethiol gives 2,5-bis(benzothiazolidin-2-yl)thiophene(I). Schiff base reacted as a neutral ligand with Pb(II) and a dianion with Cu(II), Ag(I), Cd(II), Pb(II), and Zn(II). The behavior of (I) with Hg(II), Ru(II), Pt(II), Rh(III), and Ni(II) involved the opening of the thiazoline rings of the ligand. The condensation of o-aminothiophenol with 2-thiophenecarboxaldehyde[2]

Tetradentate Schiff bases with a N2O2 donor atom set are well known to coordinate with various metal ions, and this has attracted the interest of many authors. Complexes of Schiff base ligands have been studied for their dioxygen uptake and oxidative catalysis. Furthermore, complexes of transition metals(II), which involve derivatives of salicyldhyde and diamine, have received considerable attention. This is because of their potential as catalysts for the insertion of oxygen into an organic substrate [3]

They serve as models for biologically important species and find applications in biomimetic catalytic reactions. Chelating ligands containing N, S and O donor atoms show broad biological activity and are of special interest because of the variety of ways in which they are bonded to metal ions. It is known that the existence of metal ions[4]
Very few reports exist on Schiff bases of 1,3-diketones in which the diketo group is linked to alkenyl function. Such unsaturated 1,3-diketones constitute the major physiologically active principle (known generally as curcuminoids) of the traditional Indian medicinal plant turmeric (*Curcuma longa*, Linn, Zingiberacea family) and several other related spices. Curcuminoids, their synthetic analogues and their metal complexes are known to exhibit anticancer, antioxidant and anti-inflammatory activities.[5]

The chemistry of Schiff base metal complexes are of interest because these species display a variety of reactivity mode and also because they possess catalytic and biological activity. Palladium complexes play a unique role among biologically active ions. It has been investigated for its antitumor, anti-HIV and antifungal activities.[6] ChiralRu(III) complexes, were found to be effective catalyst. It was thought worthwhile to investigate the structural features of these elements with the Schiff base derived from 2-Hydroxy-1-naphthaldehyde and ophenylene diamine.[6]

5-Acetamido-1,3,4-thiadiazole-2-sulphonamide (acetazolamide) is a diuretic drug. Diuretics are described as medicines that help to reduce the amount of water in the body. In the present day scenario, diseases such as high blood pressure, renal failure, diabetes, etc. have become very common. Hence, diuretic drugs were chosen for the present study. Schiff base metal complexes played a central role in the development of coordination chemistry. Schiff bases are widely applicable because of their industrial and biological importance and hence were well studied in the past. It was established that the biological activity of a Schiff base is altered many fold on its coordination with suitable metal ions. The introduction of nitrogen atoms into the structure of organic compounds often resulted in important changes in their behaviour towards metal ions. Many investigations were undertaken of the interaction of metal ions with ligands containing oxygen and nitrogen as donor atoms. In the present study, metal complexes of Mn(II), Fe(II), Ni(II) and Cu(II) with a Schiff base derived from 5-acetamido-1,3,4-thiadiazole-2-sulphonamide (acetazolamide) and salicylaldehyde were synthesized and characterized in view of their importance in biological systems.[7]

The synthesis of transition metal complexes with Schiff base ligands are extensively studied due to synthetic flexibility, selectivity and sensitivity towards a variety of metal atoms. They are found useful in catalysis, in medicine as antibiotics and anti-inflammatory agents and in the industry as anticorrosion. Literature is abundant on physico-chemical properties
of various Symmetrical Schiff bases and chelates with their Pyridine, 2, 2’-bipyridine and 1,10-phenanthroline adducts, while comparatively little is known on asymmetric Schiff base transition metal complexes [8].

Schiff bases are one of the most prevalent and important of the mixed donor systems which play an important role in coordination chemistry. They result from the condensation of primary amines with ketones or aldehydes to give imines containing a C=N bond which called Schiff base after Schiff [2]. Metal derivatives of Schiff bases have been extensively studied, and Ni (II) and Cu (II) complexes play a major role in both synthesis and structural research. Several complexes of salicylaldehyde and its derivatives have been studied. Encouragement for the syntheses of the symmetrical Schiff base metal complexes [9].

Schiff base form stable complexes with metal ions, especially if the amine and carbonyl compounds contain a second functional group sufficiently near the site of condensation to form five–six-membered chelate ring. Metal chelation is involved in many important biological processes where the coordination can occur between a variety of metal ions and a wide range of ligands. Many types of ligands are known, and the properties of their derived metal chelates have been investigated. In recent years, metal complexes with Schiff bases have attracted considerable attention due to their remarkable antifungal, antibacterial, and antitumor activity. Transition metal cation compounds with pyrimidine derivatives included in nucleic acids, such as uracil, cytosine, and thymine were also of special interest [10].

Schiff bases derived from condensation of aromatic aldehydes and aromatic amines form an important group of compounds in synthetic chemistry due to their useful physical and chemical properties and large number of reactions they undergo. Schiff bases are also used widely in pharmaceutical industry and have interesting pharmacological activities. Among the organic reagents actually used, Schiff bases possess excellent characteristics, structural similarities with natural biological substances, relatively simple preparation procedures and the synthetic flexibility that enables design of suitable structural properties. Many biologically important Schiff bases have been reported in the literature possessing, Antibacterial antifungal, antimicrobial, anticonvulsant, anti-HIV, anti-inflammatory, antitumor and catalytic activities. [11]