International Journal for Multidisciplinary Research
National Conference on Sciences, Pharmacy, Humanities & Commerce, Engineering for Research and Education (SPHERE – 2025)
Organized by S.P.D.M. Arts, S.B.B. and S.H.D. Commerce, and S.M.A. Science College, Shirpur in Association with PM USHA soft component, KBC NMU Jalgaon (MS)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Synthesis of Biologically Active Schiff Base Metal Complexes by Using Grapes Juice Catalyst

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Abstract.
Schiff base a class of organic compounds ,carry the imine or azomethine (=C=N-) functional group .Schiff bases played an influencing role in the development of co-ordination chemistry and were a key point in the development of inorganic ,bioinorganic chemistry and optical matterials. Schiff bases,widely used in inorganic ,organic and analystical chemistry ,account for a sign if cant portion of the more commonly employed classes of organic molecules .The ability of schiff base ligands to form stable metal complexes with a wide range of transition and other metal ions makes them extremely useful.Condensation of a primary amine with an aldehyde or ketone yields a schiff base.

Keywords: Synthesis of Schiff base , Green catalyst , Fruit juice extract ,Metal complexes, Antimicrobial Activities.

1. Introduction.

1.1 Schiff base metal complex.

The nitrogen atom with a free electron pair can form stable complexes with metals, while the C atom of the imine (-RC = N-) bond is prone to nucleophilic addition. Antibacterial properties have been reported for a variety of compounds derived from Schiff bases antifungal, antitumor and anti-HIV properties[1] The synergistic antibacterial. and anticancer potential of ferrocenyl Schiff base metal complexes in conjunction with traditional medications is investigated in this work [2] .Schiff bases are significant chelating agents that provide a wide range of options for creating practical, intriguing, and profitable ligand systems [3]. Corrosion inhibitors, catalyst supports, heat-resistant materials, metal coordination ligands, and biological or pharmacological systems are just a few of the uses for Schiff bases.Schiff base that are biologically active have antifugal ,antibacterial, antimicrobial and free radical scavenging qualities, as well as acting as inhibitors or intermediates for enzymes because of azomethine group.[4]Green synthesis can be achieved by maximizing resource efficiency, reducing hazards and pollution, and designing the entire life cycle of an active pharmaceutical ingredient (API) with

sustainability in min [5]. Biological processes depend on metal ions, and medical inorganic chemistry is a field of study that deals with the application of inorganic chemistry to illness or medicine diagnostics.[6] The scientific community has given Schiff base metallic complexes a lot of attention because of their special qualities and numerous uses in a variety of sectors, including biology and industry [7]. Despite being environmentally friendly, biological methods have limited efficacy against persistent pollutants and slower rates.[8] Scientist have a recently become interested in a number of encouraging discoveries regarding the antimicrobial and anticancer properties of Cu complex .[9] Furthermore, it is known that Schiff bases and Schiff bases derived from salicylaldehyde are polydentate ligands that can coordinate with metal ions in both their neutral and deprotonated state.[10] Notably,many studies have examined the metal complexes of Schiff bases. The Schiff bases generall display bidentate ligand behavior and interact with metallic cations to produce neutral metal complexes.[20]

1.2 Green Synthesis of Schiff base metal Complex:

The preparation of Schiff base metal complexes by constituent combination method has been in use but most recently the solvent extraction method.[11] Because of their chemical characteristics that allow complex formation with suitable ligands, transition metal ions are essential in both pharmaceutical chemistry and living systems. The metal ions, ligands, and complex structure of these complexes affect their pharmacological activities , determining their the capacity to aacess particular target locations within the body.[12] The creation of transition metal complexes with Schiff-type ligands has received more attention recently because of their intriguing biological characteristics.

Copper complexes have garnered attention among transition metals because of their varied biological zand catalytic characteristics.[1] The Schiff base metal complexes synthesis, structural diversity, electronic control mechanisms, and capacity to coordinate with transition metals, these compounds are the class of ligands that are commonly used as useful chelates. These substances have multiple resources. [13] Compared to the complex state, the Schiff bases are less reactive when they are free ligands. The effectiveness of the ligand-complex increases whenever a metal reacts with a Schiff base ligand. Therefore, coordinated complexes led to a significant increase in chemistry because of metal complexes.[14] They act as role models for species that are significant to biology. Schiff bases are also utilized as adaptable elements in cycloaddition reactions and nucleophilic addition with organometallic reagents. [15] In the creation of therapeutic agents, metal complexes provide a more appealing and secure substitute for organic small molecules. A central metal ion bound to one or more organic or inorganic compounds makes up a transition metal complex.Ligands by means of dative covalent connections. [16] Schiffbase ligands, which can coordinate to the metal through both nitrogen and oxygen, form stable complexes with the majority of transition metal ions. The significance of the Schiff-base complexes is largely determined by biological characteristics.[17] A cost-effective technique commonly used for juice production, although it may lead to a reduction in soluble solids content.[18] Bioactive compounds in grape pomace from the wine and juice industry have been recognized as valuable sources of antioxidants and antibacterial agents[19] In addition to its refreshing taste, grape juice is well known for its abundance of bioactive substances, especially polyphenols, which have been linked to a number of health advantages, such as cardioprotective, anti-inflammatory, and antioxidant properties. Numerous Schiff bases and their

copper(II) derivatives have been reported to possess promising catalytic anticancer or biological properties and have been successfully used as models in biological systems[20].

2.0 Materials and Methods.

Fresh greapes were obtained from local market in shirpur (i.e. Easily available in everywere in the Dhule District,India.),Ethanol ,Sonicator Instrument was used extraction and catalyst preparation throught the research.

Experimental Section:

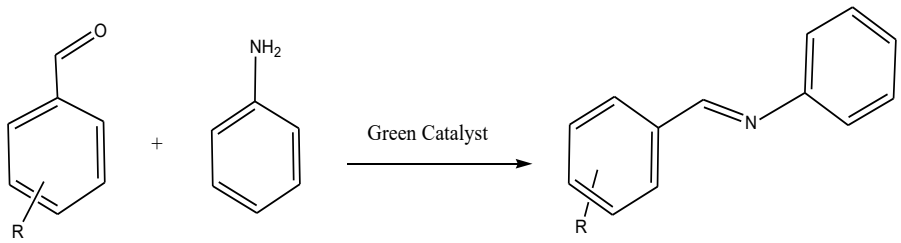
2.1 Preparation of fruit juice extract.

For synthesis of Schiff base and were extracted from the grapes juice. Some grapes were washed in tapwater and 10 gm of grapes was used for extraction in 20 ml of ethanol.Crushing the grapes in mortal pestle extract the 5 ml pure grapes juice added in 20 ml ethanol centrifuge the sonicator instrument in 5 min After the solution filter and collect the beaker.

A) Synthesis of Schiff bases:

The Schiff base are synthesized by using aniline (Aromatic amine) and substituted aromatic aldehydes in presence of green catalyst.As shown in figure no 1 the reaction of aromatic amine and aromatic aldehyde were carreid out using Grapes juice extract .To synthesis of schiff base by using 0.01 mol substituted aromatic benzaldehyde and 1 gm of aniline with constant strirring and 5 ml of alcoholic grapes juice extract is used as a catalyst the reaction mixture was strirred in magnetic strirrer at room temperature, the progress of the reaction was checked by TLC ,using a solvent system of n-Hexane and ethyl acetate (4:1) ratio . The reaction was completed within (2 to 3) hour. The reaction is completed in separete the TLC spot filter the product solid form. And recrystallization of product melting point .

Figure no 1 : Synthesis of Schiff base using Aromatic aldehyde and aromatic amine by using Grapes juice extract as a green catalyst .



B) Synthesis of metal complexes by using the synthesized Schiff Base .

The round bottom flask containing solution of metal copper chloride salt treated with the ethanolic sulution of ligand to form the metal copper chloride complexes with schiff base ligands. As reaction shown in figure no 2 the schiff base ligand in 20 ml ethanal ,wsas added in a 1.2 molar ratio, 1 mole (0.85) gm of copper chloride and 2 mole (2.26) gm of schiff base those compound adding after colour change with reflux and contineous stirring and heating in water bath on 3 to 4 hours .The complex formation checked by TLC after every 30 minutes ,then TLC spot separated in reaction collect in china dish to overnight

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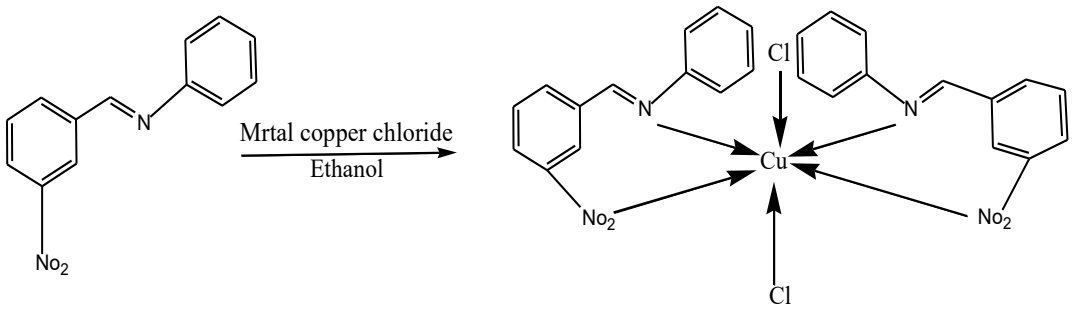
evaporated the solid form and final product again colour change. Recrystallization of the solid form hot ethanal yielded the compounds.

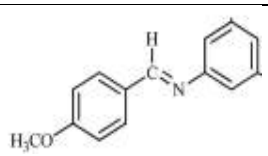
Figure no 2: Synthesis of metal complexes by using the synthesized Schiff Base.

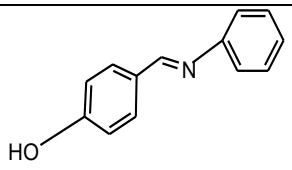
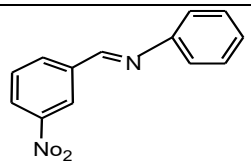
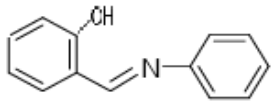
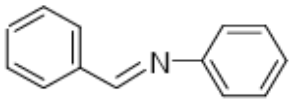
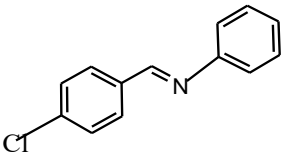
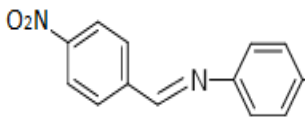


Results.

Herein, synthesis and to obtained high yield of the schiff base product with green catalyst Organic material is developed.This is achievedby adopting the green method for schiff base reaction between benzaldehyde aniline with green catalyst (Grapes Juice) extract .As shown in table no 1 it is observed that the desired product N-Benzylidene aniline is formed with 80 % yield.

Table no 1. Synthesis of Schiff Base and their Copper Metal Complex.

Sr. No	Schiff base structure	Schiff base name	Metal complex	Sample code	Melting point
1		(E)-N-(4-methoxyben-zelid ine) aniline	[Cu((E)-N-(4-methoxyben-zelid ine) aniline)2 .Cl2.2H2O]	C1-Cu	250 °C

2		**(E)-N-(3nitrobezyli-dene) benzenamine**	**[Cu((E)-N-(3nitrobezylidene)benzenamine)2 .Cl2.2H2O]**	**C2-Cu**	**239 °C**
3		**(E)-4-((phe-nylimino)methyl)phenol**	**[Cu((E)-4-((phenylimino)methyl)phenol)2.Cl2. .2H2O]**	**C3-Cu**	**247 °C**
4		**E)-2-(phe-nylimino)methyl)phenol**	**[Cu((E)-2-(phenylimino)methyl)phenol)2 .Cl2.]**	**C4-Cu**	**224 °C**
5		**(E)-N-(benzelidine) aniline**	**[Cu((E)-N-(benzelidine) aniline)2 .Cl2.2H2O]**	**C5-Cu**	**219 °C**
6		**(E)-N-(4-Chloroben-zylidene) -3-benzenamine**	**[Cu((E)-N-(4-chlorobenzylidene)-3-benzenamine)2 .Cl2.2H2O.]**	**C6-Cu**	**276 °C**
7		**(E)-N-(4-Nitrobenzyli-dene) -3-benzenamine**	**[Cu((E)-N-(4-Nitrobenzylidene) -3-benzenamine)2 .Cl2.2H2O.]**	**C7-Cu**	**255 °C**

Conclusion:

Cu-Schiffbase metal complexes are created using chip and environmentally green catalysts. This catalyst is readily accessible. Spectroscopy was used to characterize and identify the Cu-Schiff base metal complexes that were formed.

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