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In-Vitro Anti Diabetic Activity Of Copper (Ii) Complex With Dibenzalacetone

Dr. S. K. Periyasamy[1*], Dr. M. Venkatesan[2], Mrs. S. Savitha[3], Dr. S. Ambika[4] , Dr. S. Gopinath[5]
[1*]Assistant Professor of Chemistry, PG & Research Department of Chemistry
Jamal Mohamed College (Autonomous) (Affiliated to Bharathidasan University), Tiruchirappalli - 620 020, Tamilnadu, India, skpjamal@yahoo.com
[2]Assistant Professor, Department of Chemistry, J.J.College College of Engineering& Technology, (Sowdambika Group of Institutions), Tiruchirappalli - 620 009, Tamilnadu, India
[3]Assistant Professor, Department of Chemistry, St.Joseph's College of Engineering (Autonomous),OMR, Chennai - 600 119, Tamilnadu, India
[4]Assistant Professor, Department of Chemistry, M. Kumarasamy College of Engineering (Autonomous) Karur-639 113, Tamilnadu, India
[5]Assistant Professor, Department of Chemistry, Chettinad College of Engineering& Technology, Karur- 639 114, Tamilnadu, India

Abstract
Dibenzalacetone ligand was synthesized via Claisen- Schmidt condensation between benzaldehyde and acetone. The synthesized ligand was characterized by using various spectroscopic techniques such as FT- IR, UV, ^{1}H, and ^{13}C NMR. Further, Dibenzalacetone Copper (II) complex was prepared. The synthesized complex was characterized by using various spectroscopic techniques such as FT- IR, UV, ^{1}H, and ^{13}C NMR. Finally, the anti-diabetic activity of Dibenzalacetone Copper (II) complex was assessed using in-vitro assays on amylase and glucoside. In this work result indicates the promising of the anti-diabetic properties and highlighting the potential of Dibenzalacetone Copper (II) complex for the development on diabetic disease.
Keywords : *Dibenzalacetone, Copper (II)complex , Anti diabetic activity, In-vitro study*

INTRODUCTION:

Copper is one of the many transition elements, whose ions are essential for living organisms, plants as well as animals. A few copper proteins occur in some aerobic prokaryotes Most of the copper(II) complexes are blue or green because of d-d absorption in the 600-900 nm region. There are exceptions in which there are strong charge transfer bands tailing in to the visible region causing a red brown appearance. [1]Synthesis of copper(II), nickel(II) and cobalt(II) complexes having an imino benzene moiety bridging between the two metal ions. The ligand was obtained by the condensation of salicylaldehyde with m- or p-phenylenediamine.

The copper and nickel complexes showed antiferromagnetic interaction and cobalt complex showed weak antiferromagnetic exchange interactions. [2]Synthesis and characterization of mono- and dinuclear copper(II) complexes with a tetradentate Schiff base, 4′,5′-bis(salicylideneimino)benzo-15-crown-5. [3]Preparation, characterization and the antibacterial activity of binuclear Cu(II), Co(II), Ni(II), VO(II) and Zn(II) complexes derived from3-hydroxysalicylaldehyde,4-hydroxysalicylaldehyde and 5-bromosalicylaldehydewithN-(pyridyl)-2-hydroxy-3-methoxy- aminobenzylamine.

Antimicrobial activities of the ligands and their complexes have been tested against the strains of Bacillus subtilis, Micrococcus luteus, Saccharamyes cerevisiae and Candida albicans. [4]Synthesis of N,N'-polymethylene-bis(salicylaldiminato) copper(II) complexes with alkyl back bones ranging from two to eight carbons. The complexes are monomeric when the alkyl chain length is relatively short (two, three and four 19 CH_2 groups) but are dimers when the chain length becomes longer (five, six and eight CH_2 groups). [5]Synthesis of dicopper complex of a Schiff base 2-[(4-methyl-pyridin-2ylimino)-methyl]-phenol with a bridging acetato ligand characterised by single crystal XRD, EPR, magnetic susceptibility, IR, UV- Vis, CV and elemental analysis. [6]Synthesis, characterisation and study of magnetic properties of μ-alkoxo-μ-pyrazolato bridged dicopper(II) complexes.[7]Synthesis of Tris(μ-p-methylbenzoato-O,O′)bis(N,N,N′,N′-tetramethyl-1,2-diaminoethane)dicopper(II)hexafluorophosphate, $[Cu_2(O_2CC_6H_4Me\text{-}p)_3(tmen)_2]PF_6$, which was prepared from a reaction of $[Cu_2(O_2CC_6H_4Me\text{-}p)_4(H_2O)_2]$ with in ethanol at 0° C and characterized by spectral, electrochemical, magnetic and X-ray crystallographic studies. .[8]The structural and electrochemical studies of Co(II), Ni(II), Cu(II) and Cd(II) complexes with a new symmetrical N_2O_2 Schiff base and crystal structure of the ligand 1,2-di[4-(2-imino-4- oxopentane)phenyl]ethane was also studied. The coordination occurs through the N_2O_2 system.

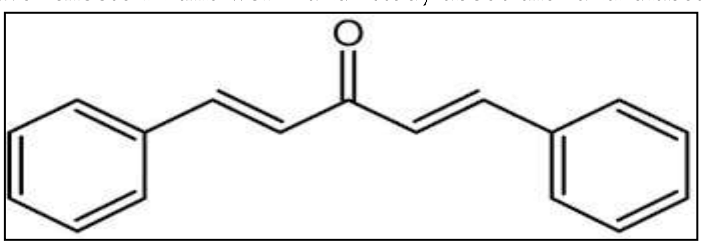
Preparation of binuclear copper, nickel and cobalt complexes of the Schiff bases obtained by the condensation of glycylglycine with acetyl acetone, benzoyl acetone, dibenzoylmethane and thenoyltrifluoroacetone.[9] [10]Synthesis of chiral binuclear copper(II) complexes from aldehydes and amino alcohols. [11]Synthesis and characterization of binuclear dichloro-bridged copper(II) complexes, the ligands have been synthesised by the condensation of acetyl acetone and p-phenylenediamine. Each copper showed square planar geometry with ONClCl coordination, a mixed valence Cu(I) Cu(II) complex has been suggested. [12]Synthesis of copper(II) and zinc(II) complexes using the ligands N-[(2-pyridyl)-methyl]-salicylimine (Hsalampy), N- [2-N,N-dimethyl-amino)-ethyl]salicylimine (Hsaldmen) and N-[(2-pyridyl)- methyl]-3-methoxy-salicylimine (Hvalampy). .[13]Synthesis of Schiff base ligand derived from the reaction of p-aminoazobenzene with salicylaldehyde, 2,4-dihydroxybenzaldehyde and 2,3,4-trihydroxybenzaldehyde respectively. The oxidative C-C coupling properties of the Co(II) and Cu(II) complexes were investigated on the sterically hindered 2,6-di-tert-butylphenol (DTBP). The Schiff base ligands and their complexes were evaluated for both their in-vitro antibacterial activity using the disc diffusion method.Copper metal ion bind with various ligand to form complexes.

Dibenzalacetone, a prominent chalcone derivative, was synthesized through the classical Claisen-Schmidt condensation reaction, a widely employed method for the preparation of chalcones.

Dibenzylideneacetone is used as a component in sunscreens and as a ligand in organometallic chemistry.For example, it is a component of the catalyst tris(dibenzylideneacetone)dipalladium(0). It is a labile ligand that is easily displaced by triphenylphosphine, hence it serves a useful entry point into palladium(0) chemistry.

STRUCTURE OF DIBENZALACETONE LIGAND:

In the above literature, Many researchers does not work in biological activity of dibenzalacetone copper (II) complex. So we have choose in this work and study about the anti diabetic activity of dibenzalacetone



copper (II) complex.

In this present work complex was formed copper (II) with dibenzalacetone ligand

Main objective of the work:

The research work aims to comprehensively explore the synthesis of Dibenzalacetone ligand. Characterization of the synthesized Dibenzalacetone ligand utilizes various analytical techniques including FTIR, UV, H^1 NMR and C^{13} NMR spectroscopy, to assess its structural integrity and purity.The main aims to synthesis of Dibenzalacetone Copper (II) Complex and focusing on its synthesis, characterization, and potential anti-diabetic properties.Characterization of the synthesized Dibenzalacetone Copper (II) Complex utilizes various analytical techniques including FT-IR, UV, H^1 NMR and C^{13} NMR spectroscopy, to assess its structural integrity and purity.The anti-diabetic activity of Dibenzalacetone Copper (II) Complex Complex is evaluated through in-vitro studies.Data analysis and interpretation aim to provide insights into the compound's properties and anti-diabetic efficacy.Discussions address implications for future research and therapeutic applications, aiming to contribute to the understanding of Dibenzalacetone Copper (II) Complex potential in diabetic therapy.

The research work seeks to pave the way for further exploration in the field of medicinal chemistry and endocrinology through its comprehensive investigation of Dibenzalacetone Copper (II) Complex

MATERIALS AND METHODS

Experimental methods:

Preparation of Dibenzalacetone ligand:

Procedure

Take a conical flask add 10ml freshly distilled benzaldehyde and 20ml of acetone. Place the flask in cold water bath and then add 2.5ml sodium hydroxide drop wise with constant stirring. Maintain the temperature at 30^{o}C. After the complete addition of sodium hydroxide stir the mixture for 2 hours. Add dilute hydrochloric acid to the reaction mixture and then transfer to a 250ml separating funnel. Add 20ml of chloroform/ether to the mixture and shake thoroughly. Shake the mixture thoroughly, remove the organic layer and repeat the process twice. Cool the mixture in ice-water. Dibenzalacetone separates initially as a fine emulsion and then forms yellow crystals.

Distil the residual portion under pressure and collect the fraction boiling at 150^{o}c and Wash the pale yellow crystals with cold water, dry and crystallize them with ethanol.

Characterization of Dibenzalacetone ligand:

The FT-IR spectrum of DBA was obtained using the BRUKER ALPHAFT-IR MB 102 spectrophotometer, in the 4000-400 cm^{-1} region on KBr pellets. The electronic spectra (UV-Vis spectra) of DBA ligand was put on record in ethanol solvent using UV-Vis Double Beam Lamda 25 Perkin Elmer spectrophotometer. The ^{1}H (500 MHz) and ^{13}C (125 MHz) NMR spectra were performed on the BRUKER ADVANCE spectrometer, using dimethylsulfoxide ($(CD_3)_2SO$).

Purification of solvents:

The commercial solvents were distilled and then used for the preparation of the complex and for spectral experiments. Dry ethanol was prepared by refluxing them with Magnesium Turnings and Iodine and then distilling over $CaCl_2$

Preparation of Dibenzalacetone Copper (II) Complex:

Procedure:

1. **Dissolution of Copper Salt:**

Dissolve 1.0 g of copper (II) sulphate in 50 mL of ethanol with constant stirring at room temperature. Heat gently (if necessary) until the copper salt is completely dissolved.

2. **Preparation of Dibenzylacetone Solution:**

Dissolve 1.5 g of dibenzylacetone in 50 mL of ethanol in a separate beaker. Stir until a clear solution is obtained.

3. **Dibenzalacetone Copper (II) Complex Formation:**

Dibenzalacetone (1.5 g, 1 mmol) in 50 mL of methanol solvent was added dropwise to a methanolic solution (50 mL) of copper sulphate pentahydrate (0.249 g, 1 mmol) accompanied by a stirring continuously for 45 minutes at room temperature. green or blue precipitate en precipitated was filtered off, washed with ethanol and dried under vacuum (0.164 g, 70.42%).

4. **Filtration and Washing:**

Filter the precipitate using a Büchner funnel and wash with small amounts of cold ethanol followed by cold distilled water to remove any unreacted reagents.

5. **Drying:**

Dry the product in air or in a desiccator over calcium chloride or silica gel.

The final product should be a crystalline solid, typically green or blue, depending on the exact nature of the complex.

Characterization of Dibenzalacetone Copper (II) Complex :

1.Color Change: The formation of a blue/green solid confirms complexation.

2. Copper analysis:

The copper content of the DBA complex was estimated by EDTA titration. A known weight of complex(approximately 25 mg)was taken in a beaker, decomposed using 1:1 mixture of Con HNO_3 and Con.H_2SO_4 and carefully heated to drynesss.This procedure was repeated four times and then the residue obtained was extracted with 2 ml of Con .HCl. This was diluted to 50 ml in a conical flask and ammonium chloride - ammonium hydroxide buffer (pH = 10) 5 ml was added and titrated against standard EDTA(0.01 M) solution using Fast Sulfon Black F as the indicator. The end point is the colour change blue to green. From the titre value the percentage of copper in in the complex was calculated.

3. Conductivity Measurement:

The conductivity of DBA Copper (II) complex in DMF was measured by using EQUIPTRONICS EQDCMP bridge with a solute concentration of 1 X 10-3 M.

Molar conductivity analysis

The molar conductivity measurement was applied to found out the conductivity of the complex and its cation-anion charge ratio. Besides, the position of sulphate ion in the complex was also confirmed by comparing the molar conductivity of the copper(II) complex to the molar conductivity of the standard solutions of known metal salts (in DMSO 10^{-3}M), shown in Table 1. The molar conductivity of Cu(II) complex was 0 $S.cm^2.mol^{-1}$, which showed that the complex was non-electrolyte. This indicates the absence of counter ions in the Cu(II)-Dibenzalacetone complex so that the sulphate ion is also coordinated to the Cu(II) center ion. Thus, the proposed complex formula of Cu(II)-Dibenzalacetone was $[Cu(Dibenzalacetone)_2(SO_4)]\cdot 5H_2O$.

Table 1 : Molar conductivity of Dibenzalacetone Copper (II) Complex

Solution	Λ_M	Cation : Anion Charge
DMSO	0	-
$CuSO_4 \cdot 5H_2O$	2	1 : 1
Cu(II)- Dibenzalacetone	**0**	**-**

4.Characterization of Dibenzalacetone Copper (II) complex:
The FT-IR spectrum of Dibenzalacetone Copper (II) complex was obtained using the BRUKER ALPHAFT-IR MB 102 spectrophotometer, in the 4000-400 cm^{-1} region on KBr pellets. The electronic spectra (UV-Vis spectra) of DBA ligand was put on record in ethanol solvent using UV-Vis Double Beam Lamda 25 Perkin Elmer spectrophotometer. The ^{1}H (500 MHz) and ^{13}C (125 MHz) NMR spectra were performed on the BRUKER ADVANCE spectrometer, using dimethylsulfoxide ($(CD_3)_2SO$).

5.Anti-Diabetic activity of Dibenzalacetone Copper (II) complex :
The anti-diabetic activity of dibenzalacetone Copper (II) complex was evaluated by glucose uptake assays using Saccharomyces cerevisiae (baker's yeast) from Evolute Bioscience Laboratory, woraiyur, Tiruchirappalli.

Materials Requirements of anti-diabetic activity:
Glucose solution (10 mM), Metronidazole (10 mg/ml), **Dibenzalacetone Copper (II) complex** , yeast suspension, distilled water.

Preparation of Yeast suspension
To prepare the yeast cells, 1 g of yeast was suspended in 10 mL of distilled water, followed by centrifugation at 3000 rpm for 5 minutes and repeated washing with distilled water. The washed yeast was then resuspended to obtain a 10% yeast suspension.

Procedure:
For the glucose uptake assay, 1 mL of 10 mM glucose solution was prepared in test tubes, and 100 µL of dibenzalacetone Copper (II) complex was added.Subsequently, 100 µL of yeast suspension was introduced, and the mixture was incubated at 37°C for 10 minutes. After incubation, the tubes were centrifuged at 3000 rpm for 5 minutes, and the glucose concentration in the supernatant was measured using a spectrophotometer at 540 nm with the DNS (Dinitrosalicylic Acid) reagent.The reduction in glucose concentration was calculated to determine the extent of glucose uptake by yeast cells, where higher glucose uptake indicated potential anti-diabetic activity.

Calculation of percentage of glucose uptake :
% Glucose uptake = $\{(C_0 - C_1)/C_0\}*100$

RESULT AND DISCUSSION

Characterization of Dibenzalacetone ligand:
The synthesized Dibenzalacetone ligand was characterized by the following analytical assays

- FT-IR Spectroscopy
- UV-Visible Spectroscopy
- H^1 NMR Spectroscopy
- C^{13} NMR Spectroscopy

FT-IR Spectrum of Dibenzalacetone
The Infrared (IR) spectrum of dibenzalacetone (Figure -1) exhibits characteristic absorption bands corresponding to its functional groups[14].In Table 2 explained the aromatic C-H stretching vibrations are observed at approximately 3023 cm^{-1}.The stretching vibration of the carbonyl group (C=O) appears as a peak around 1681 cm^{-1}.The absorption band at 1493 cm^{-1} corresponds to the stretching vibration of $-CH_2-$ groups.

Table 2 : IR spectral data of Dibenzalacetone ligand

Functional groups	**IR Frequency Cm^{-1}**
Aromatic C-H	3023

C=O	1681
$-CH_2-$	1493

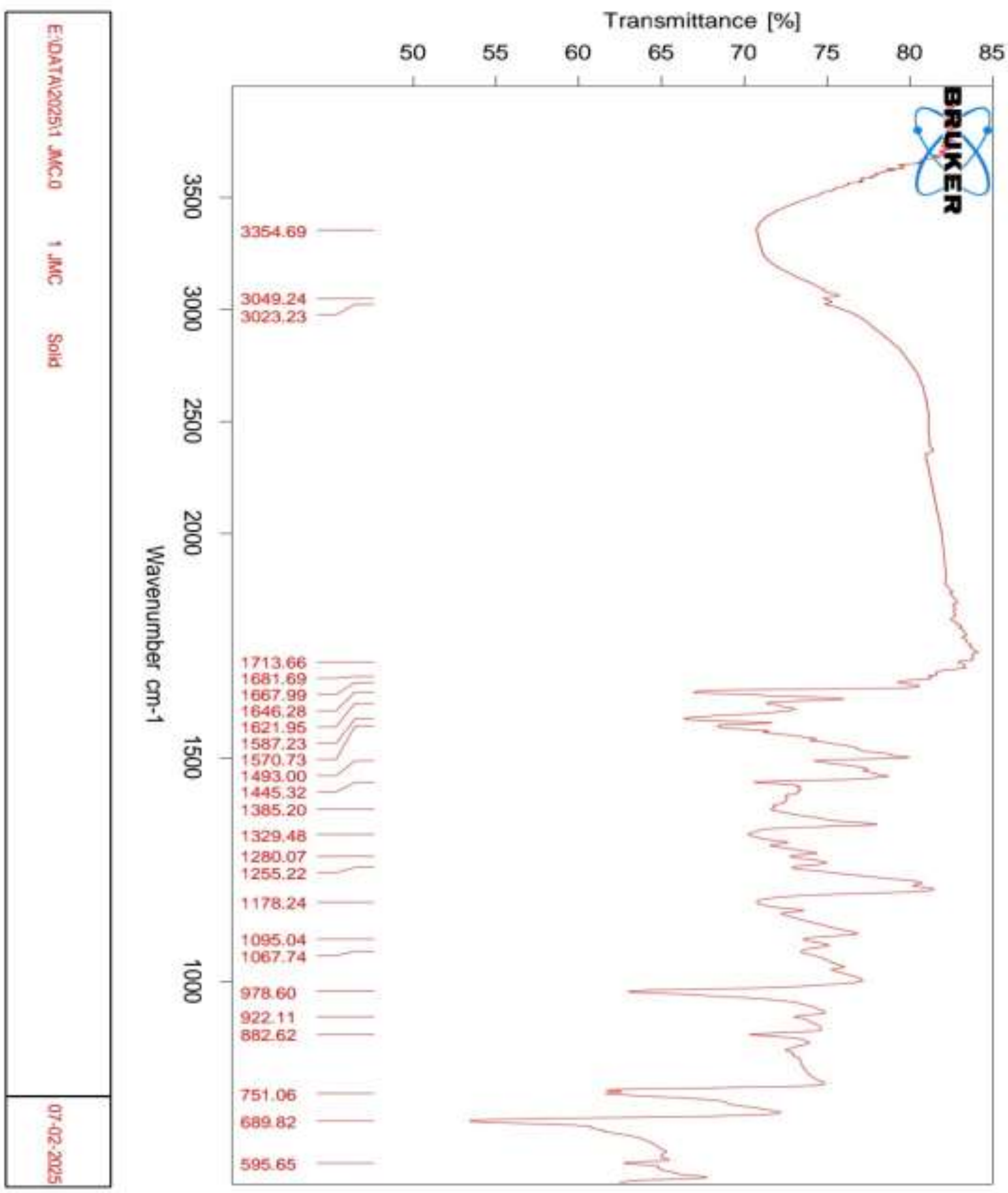


Figure 1: IR spectrum of DBA ligand

UV-Visible Spectrum of Dibenzalacetone ligand:

In UV-Visible spectroscopy spectrum[15] shows absorption peaks at **335 nm** and **206 nm**, this suggests the presence of specific electronic transitions, likely due to conjugated systems or functional groups in the dibenzalacetone ligand.

Peak in 335 nm:

- **Region:** Falls in the near-UV to visible range.
- **Possible Transitions:** Typically corresponds to $\pi \rightarrow \pi^*$ transitions.

- **Possible Compounds:**
- **Conjugated systems**: Molecules with extended conjugation (e.g., polyenes, aromatic rings with electron-donating groups).
- **Aromatic compounds**: Some substituted benzene derivatives, polycyclic aromatic hydrocarbons (PAHs).
- **Chromophores like flavonoids** or some organic dyes.
- **Transition metal complexes** (ligand-to-metal charge transfer).

Peak in 206 nm:

- **Region:** Falls in the deep-UV region.
- **Possible Transitions:** Usually corresponds to **n → π*** or **π → π*** transitions.
- **Possible Compounds:**
- **Benzene and substituted aromatics**: Aromatic hydrocarbons typically absorb around 200–210 nm.
- **Alkenes and conjugated dienes**: Simple alkenes absorb in this range.
- **Proteins and peptides**: Due to peptide bond absorption.
- **Nucleic acids (DNA/RNA)**: Strong absorption due to the purine and pyrimidine bases.

UV-Visible Spectrum of Dibenzalacetone ligand :

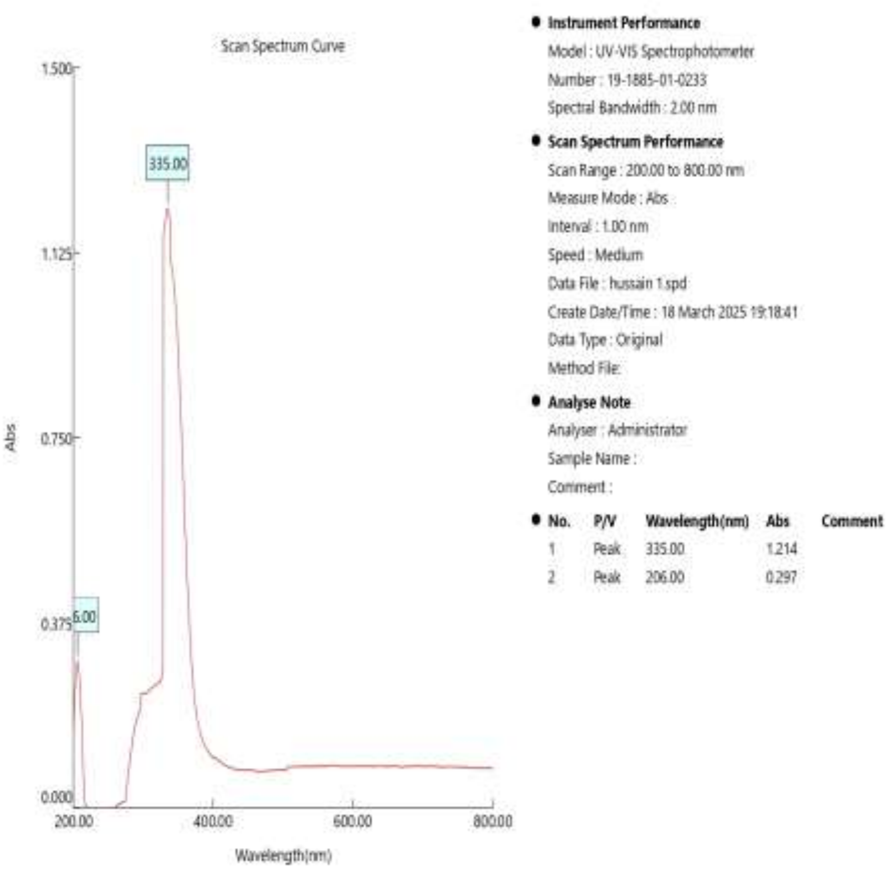


Figure 2: UV spectrum of DBA Ligand

H^{1}NMR Spectrum of Dibenzalacetone ligand :

The synthesized dibenzalacetone are characterized(Figure -3) by H^1 NMR Spectrum[16]. The Interpretation of this compound (Table-3) is given below.

Aromatic Protons : A prominent multiplet in this range was observed, attributed to the aromatic protons on the benzene rings. The signals appeared broadened due to coupling with neighbouring protons. The exact chemical shifts within this range may vary depending on factors such as solvent polarity and ring substitution patterns.
Alpha-Carbon Proton Adjacent to Carbonyl Group : A multiplet centered around δ 2.40 ppm was observed, corresponding to the proton on the alpha-carbon adjacent to the carbonyl group. This multiplet arises due to coupling with neighbouring protons, including those on the benzene rings and neighbouring methylene groups. The chemical shift and splitting pattern provide insights into the chemical environment and connectivity of this proton.

Table 3: H^1 NMR Data of Dibenzalacetone ligand

Proton Type	Chemical Shift (ppm) Range
Aromatic Protons	7.09 - 7.79
Alpha-Carbon Proton (adjacent to carbonyl group)	2.40
Methylene Protons	TBD
Aliphatic Protons	TBD

H^1 NMR Spectra of DBA

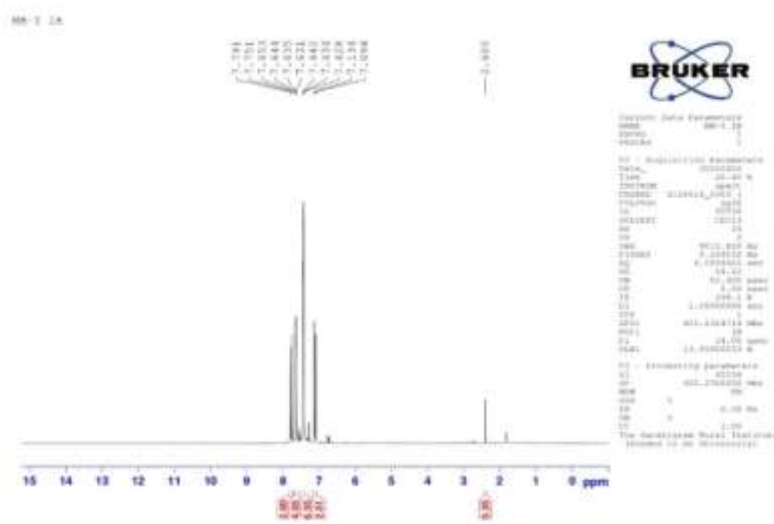


Figure 3: ^{1}H NMR spectrum of DBA Ligand

C^{13} NMR Spectrum of Dibenzalacetone ligand:
The Synthesized Dibenzalacetone ligand was characterized(figure-4) by C^{13} NMR Spectrum[17]. The Interpretation of this compound (Table-4) is given below.
Carbonyl Carbon (C=O) : A sharp peak was observed in the spectrum around δ 189 ppm, corresponding to the carbonyl carbon (C=O) of the molecule. The precise chemical shift of this peak depends on factors such as

molecular environment and any conjugation effects with adjacent functional groups.
Aromatic Carbons : Several peaks were observed in the range of δ 125 – 143 ppm, indicative of the carbon atoms within the benzene rings of dib enzalacetone. The chemical shifts of these peaks vary depending on the degree of substitution and the presence of electron-withdrawing or electron-donating groups.
Aliphatic Carbons : Signals corresponding to aliphatic carbons, including those in the alkene and alkyl chains, were observed in the spectrum within the range of δ 0 - 80 ppm. The alpha-carbon adjacent to the carbonyl group may appear around δ 76 - 77 ppm due to the electron-withdrawing effect of the carbonyl group.

Table 4: C^{13} NMR Data of Dibenzalacetone ligand

Carbon Type	Chemical Shift (ppm) Range
Carbonyl Carbon (C=O)	189
Aromatic Carbons	125 – 143
Aliphatic Carbons	76 – 77

C^{13}NMR Spectra of Dibenzalacetone ligand :

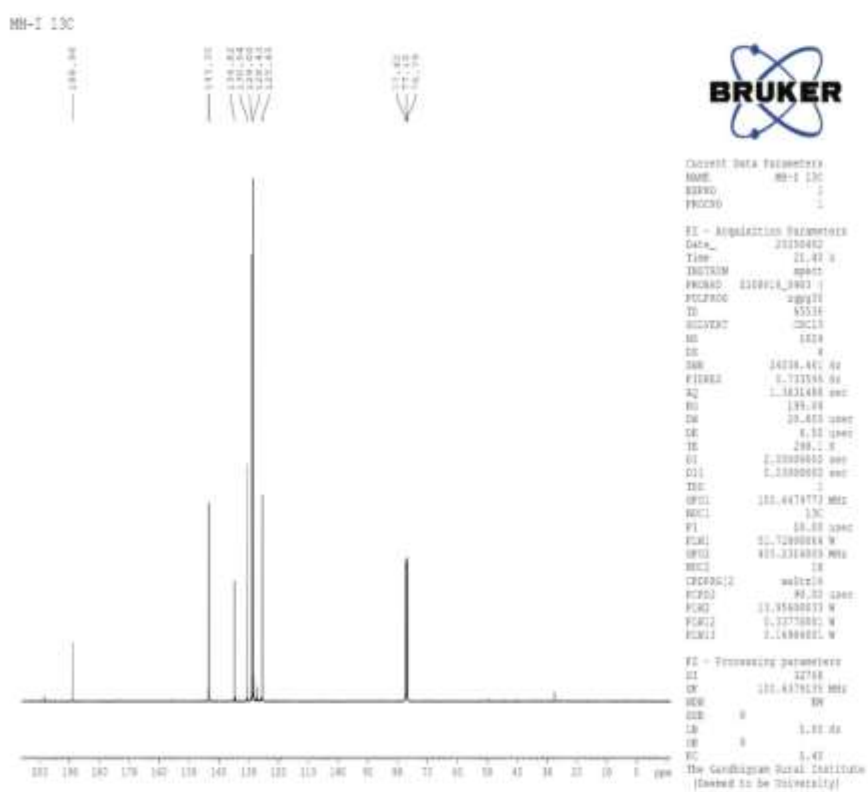


Figure 4: ^{13}C NMR spectrum of DBA Ligand
Characterization of Dibenzalacetone Copper (II) Complex:
The synthesized Dibenzalacetone Copper (II) complex was characterized by the following analytical assays.(14-17)
- FT – IR Spectroscopy
- Electronic spectroscopy
- H^1 NMR Spectroscopy
- C^{13} NMR Spectroscopy

FT-IR Spectrum of Dibenzalacetone Copper (II) Complex:

The Infrared (IR) spectrum of dibenzalacetone(Figure -5) exhibits characteristic absorption bands corresponding to its functional groups. In Table 5 explained the aromatic C-H stretching vibrations are observed at approximately 980.86, and 866.21 cm^{1}. The stretching vibration of the carbonyl group (C=O) appears as a peak around 1668.88 cm^{-1}. The absorption band at 1242.83 cm^{-1} corresponds to the stretching vibration of C-N groups. The absorption band at 1085.21 cm^{-1} corresponds to presence of C-O bond. The absorption band at 569.65 cm-1 corresponds to presence of Cu-O coordination bond.

Table:5

IR spectral Data of Dibenzalacetone Copper (II) Complex

Functional groups	IR Frequency Cm^{-1}
O-H	3124.66
C=O	1668.88
C-N	1242.83
C-O	1085.21
Alkene C-H	980.86
Aromatic C-H	866.21
Metal – Ligand (Cu-DBA) (Cu-O coordination)	569.65

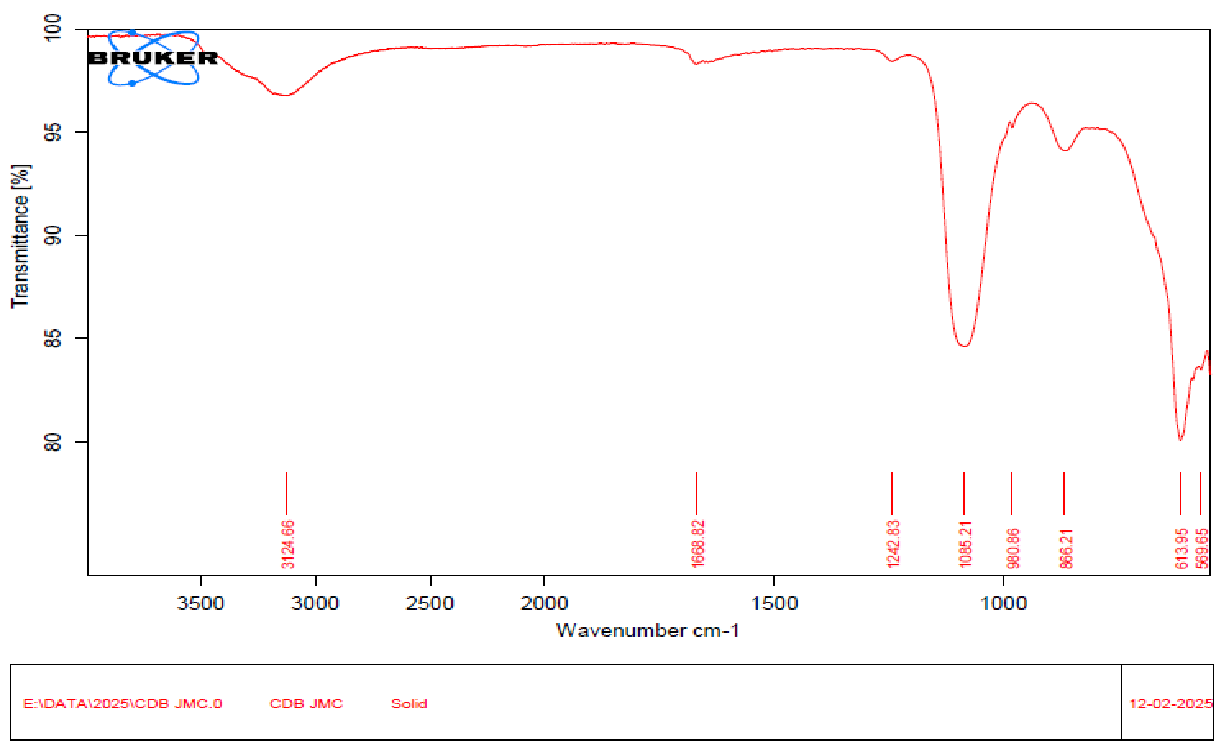


Figure 5: IR spectrum of Dibenzalacetone Copper (II) Complex:

Electronic Spectrum of Dibenzalacetone Copper (II) Complex:

The electronic spectrum **Dibenzalacetone Copper (II) Complex** is presented in figure 6. **In figure 2,** Dibenzalacetone, a compound with extensive conjugation, exhibits UV-Vis absorption peaks around 206 nm and 335nm, corresponding to π→π* electronic transitions . Upon complexation with metal ion like copper(II), the electronic spectrum can shift due to ligand-to-metal charge transfer (LMCT) and d-d transitions. For instance, certain copper(II) complexes display absorption band near 600 nm .

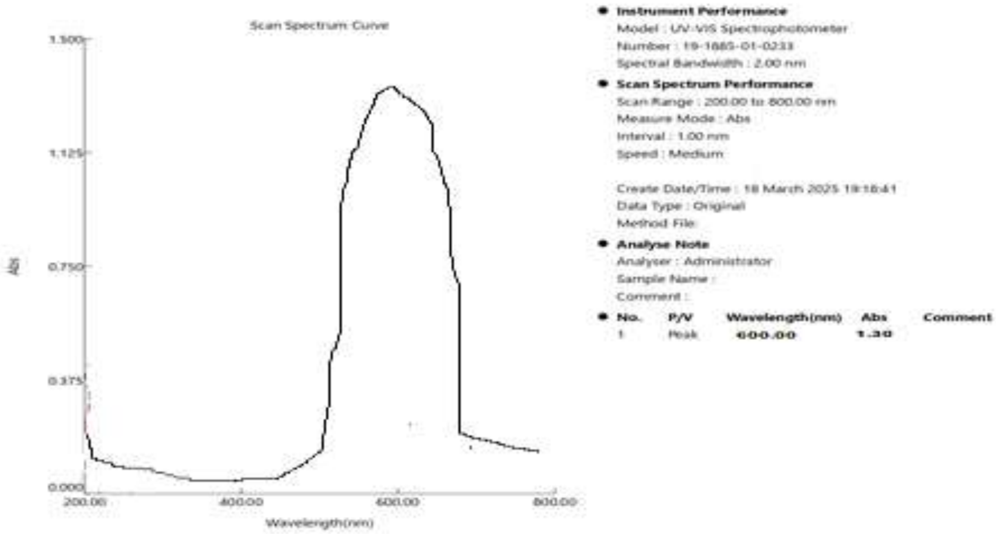


Figure 6: Electronic spectrum of Dibenzalacetone Copper (II) Complex

H^1NMR Spectrum of Dibenzalacetone Copper (II) Complex:

The Synthesized Dibenzalacetone Copper (II) Complex was characterized(Figure -7) by H^1 NMR Spectrum. The Interpretation of this compound(Table-6) is given below.

Alpha-Carbon Proton Adjacent to Carbonyl Group (δ 2.5 - 3.49 ppm): A multiplet centered around δ 2.5- 3.49 ppm was observed, corresponding to the proton on the alpha-carbon adjacent to the carbonyl group. This multiplet arises due to coupling with neighbouring protons, including those on the benzene rings and neighbouring methylene groups. The chemical shift and splitting pattern provide insights into the chemical environment and connectivity of this proton.

Table:6 H^1 NMR data of Dibenzalacetone Copper (II) Complex

Proton Type	**Chemical Shift (ppm) Range**
Alpha-Carbon Proton (adjacent to carbonyl group)	2.5 - 3.49
Methylene Protons	TBD
Aliphatic Protons	TBD

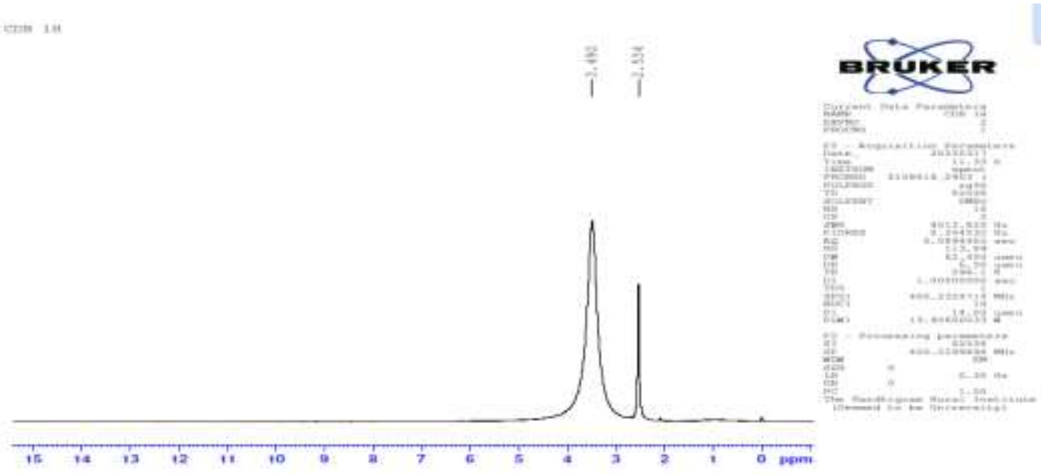


Figure 7: ^{1}H spectrum of Dibenzalacetone Copper (II) Complex:

C^{13} NMR Spectrum of Dibenzalacetone Copper (II) Complex:

The Synthesized Dibenzalacetone copper (II) complex was characterized by (Figure -8) C^{13} NMR Spectrum. The Interpretation of this compound(Table -7) is given below.

Aliphatic Carbons (δ - 41 ppm): Signals corresponding to aliphatic carbons, including those in the alkene and alkyl chains, were observed in the spectrum within the range of δ 0 - 70 ppm. The alpha-carbon adjacent to the carbonyl group may appear around δ 40 - 41 ppm due to the electron-withdrawing effect of the carbonyl group.

Table:7 C^{13} NMR Spectral Data of Dibenzalacetone Copper (II) Complex:

Carbon Type	Chemical Shift (ppm) Range
Aliphatic Carbons	40 – 41

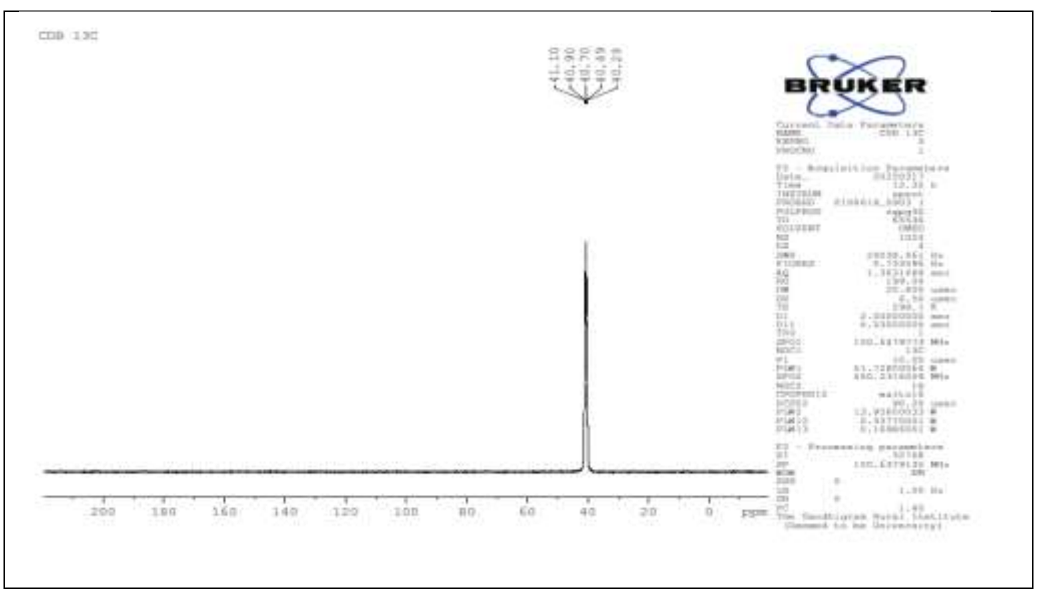
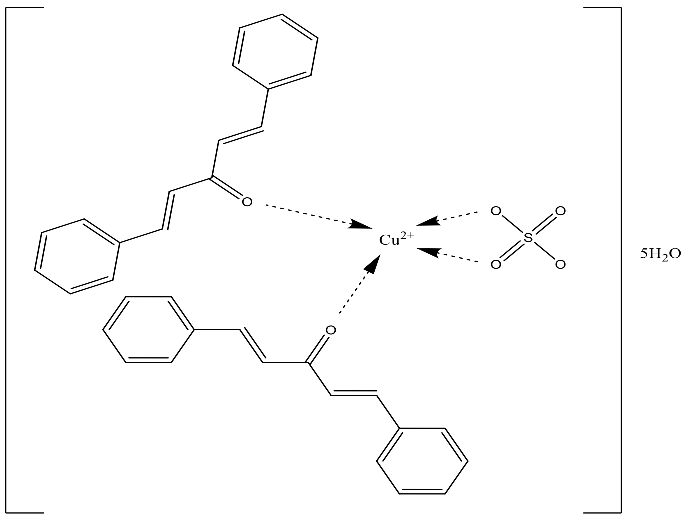


Figure 8: ^{13}C spectrum of Dibenzalacetone Copper (II) Complex:

Proposed structure of Dibenzalacetone Copper (II) Complex:

Electronic spectral measurements made in DMF solution showed ligand field band copper –DBA chromophore. Dibenzalacetone Copper (II)complex possess square based environment.The charge transfer band present around 600 nm reveals equatorial DBA →Cu (II) LMCT and d-d transitions.



Proposed Structure of Dibenzalacetone Copper (II)complex

Melting Point – 114 ^{0}C

ANTI-DIABETIC ACTIVITY DIBENZALACETONE COPPER (II) COMPLEX:

This method is based on the ability of Saccharomyces cerevisiae (baker's yeast) to uptake glucose from the surrounding medium, mimicking glucose absorption in biological systems. The principle relies on the fact that yeast cells actively transport glucose into their cytoplasm, reducing the glucose concentration in the medium. The extent of this reduction can be measured spectrophotometrically using the Dinitrosalicylic Acid (DNS) reagent, which reacts with free glucose to produce a colored complex measurable at 540 nm.

In the presence of a Dibenzalacetone Copper (II) complex , (Figure -9) if glucose uptake by yeast cells is enhanced, it suggests potential anti-diabetic activity, as it indicates improved glucose metabolism. This method provides a non-enzymatic and cost-effective approach for screening bioactive compounds with potential glucose-lowering effects, making it useful for preliminary anti-diabetic studies.

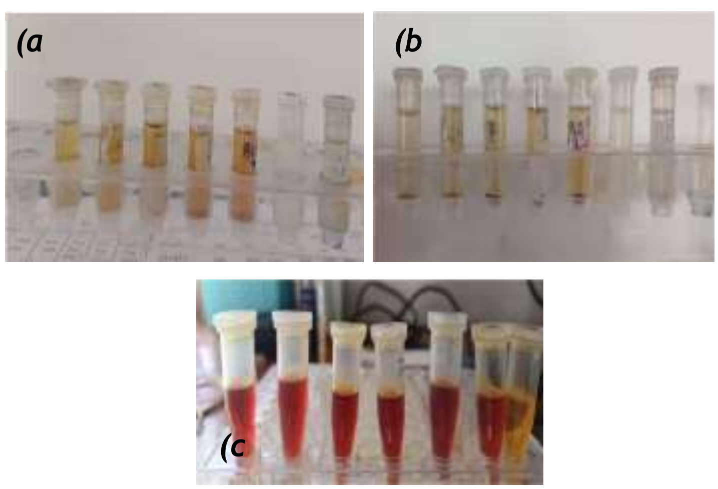


Figure:9 Glucose uptake assay by yeast cells; (a) Reaction tubes before incubation; (b) Reaction mixture after centrifugation process; (c) DNS assay method for glucose estimation.

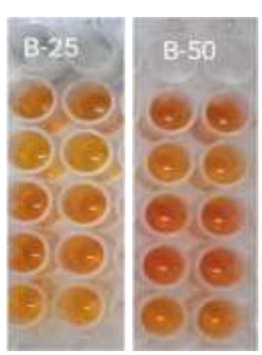


Figure:10 Anti-diabetic potential of the Dibenzalacetone Copper (II) Complex

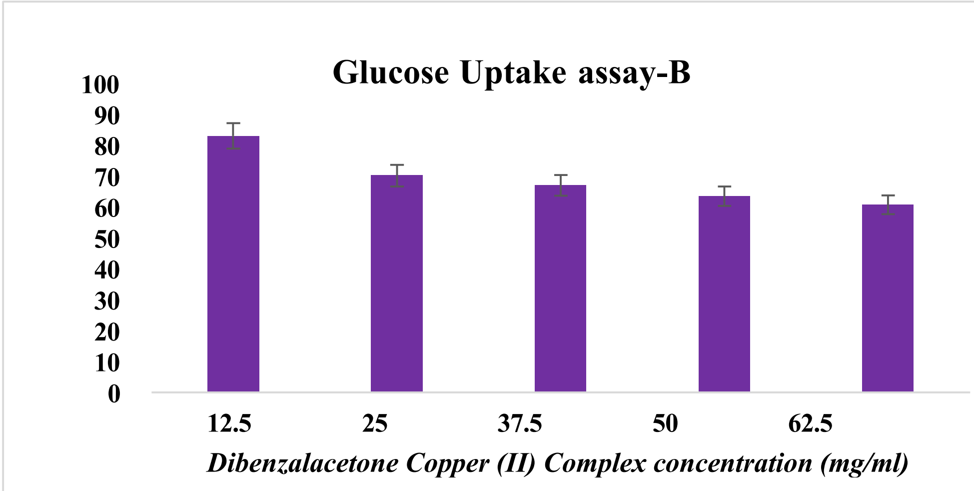


Figure:11 Graphical Representation of Anti-diabetic potential of the Dibenzalacetone Copper (II) Complex

The percentage of glucose uptake decreases with an increase in concentration of the Dibenzalacetone Copper (II) Complex. In Figure 11 indicates the maximum glucose uptake was attained at 12.5 mg/ml concentration of Dibenzalacetone Copper (II) Complex and gave 83.4 % glucose uptake for Dibenzalacetone Copper (II) Complex.These glucose uptake levels indicate that the Dibenzalacetone Copper (II) Complex test sample has high anti-diabetic activity.

CONCLUSION

In this study, Dibenzalacetone Ligand was synthesized successfully using the Claisen- Schmidt condensation reaction between benzaldehyde and acetone. The synthesized Dibenzalacetone ligand was characterized using various analytical techniques including FT-IR, UV, H^1 NMR, and C^{13} NMR spectroscopy. Next Copper (Dibenzalacetone) complex was synthesized. Then, the synthesized Copper (Dibenzalacetone) complex was characterized using various analytical techniques including FT-IR, UV, H^1 NMR, and C^{13} NMR spectroscopy and Further evaluated for In vitro anti-diabetic activity of Copper Dibenzalacetone complex.

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