


KAKATIYA GOVERNMENT COLLEGE

HANUMAKONDA

Name : Dr. K. Satyanarayana
Designation : Asst. Prof. of Chemistry
Year of Award of Ph.D. : 05th January, 2022
Name of the University : KAKATIYA UNIVERSITY
Year of entering in to Govt. Service : January 2002 as JL
November 2010 as DL

S.No.	Details of Certificates	Remarks
1	Copy of Ph.D. Certificates	Copy enclosed
2	Press note	Copy enclosed
3	Research work dates Of seminars and Pre. Ph.D <i>Date of Joining in this college</i>	Copies enclosed <i>30-06-2018</i>
4	Details of Ph.D. Admission Part time or full time	Copies enclosed
5	Copies of RDC Approval Letters of Ph.D.	NA
6	Name of guide/supervisors with mobile number and email.id	Dr. M. Ravinder Mobile no: 9951176555 Mail Id: rku76@yahoo.co.in
7	Copies of guide allotment letter	enclosed
8	No. of increments sanctioned for Ph.D.	03
9	Published research article copies	enclosed
10	Original Ph.D. thesis book	Title page enclosed <i>Hard copy available at office</i>


PRINCIPAL
KAKATIYA GOVT. COLLEGE
Hanamkonda.



Dr. Kandala Satyanarayana
ASST. PROF. OF CHEMISTRY
KGC
Hanamakonda

KAKATIYA GOVERNMENT COLLEGE

HANUMAKONDA

Name : Dr. K. Satyanarayana
Designation : Asst. Prof. of Chemistry
Year of Award of Ph.D. : 05th January, 2022
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6	Name of guide/supervisors with mobile number and email.id	Dr. M. Ravinder Mobile no: 9951176555 Mail Id: rku76@yahoo.co.in
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10	Original Ph.D. thesis book	Title page enclosed


Dr. K. Satyanarayana
Asst. Prof. of Chemistry
KGC
Hanumakonda

Sl. No. [REDACTED]

4159
273581

Kakatiya University



Faculty of Science

This is to certify that Satyannarayana K son/daughter of Ananthaiah having pursued a course of study prescribed by this University and having passed the requisite examination by thesis, has been admitted to the degree of

Doctor of Philosophy in Chemistry

The title of the thesis is:

*SYNTHESIS, CHARACTERIZATION AND ANTIMICROBIAL
ACTIVITY OF METAL COMPLEXES CONTAINING
CHROMONE DERIVATIVES*

The candidate has been declared qualified for the award of the Degree of Ph.D. on 05-01-2022

Given under the seal of the University

Warangal, Telangana State, India

Date: 04-03-2022


Vice-Chancellor



**EXAMINATION BRANCH
KAKATIYA UNIVERSITY
WARANGAL - 506 009 (TS) INDIA**

No. 07 /Ph.D./E1/KU/2022

Date: 05-01-2022

PRESS NOTE

Mr/Ms. **Satyanarayana K**, Research Scholar in **Chemistry**, Kakatiya University, Warangal, who has presented a thesis for the Degree of Ph.D. in **Chemistry** entitled "**SYNTHESIS, CHARACTERIZATION AND ANTIMICROBIAL ACTIVITY OF METAL COMPLEXES CONTAINING CHROMONE DERIVATIVES**" has been declared qualified for the Degree of **Doctor of Philosophy (Ph.D.)** of the Kakatiya University.

"By Order"

CONTROLLER OF EXAMINATIONS

Copy forwarded for information to:

1. The Registrar, Kakatiya University, Warangal.
2. The Secretary, University Grants Commission, New Delhi-110 002.
3. The Editor, University News, A.I.U., 16 Kotla Marg, New Delhi-110 002.
4. The Dean, Faculty of Sciences, KU, Warangal.
5. The Coordinating Officer, U.G.C. Unit, Kakatiya University, Warangal.
6. The Principal, University College, Kakatiya University, Wgl.
7. The Chairperson, Board of Studies in Chemistry, K.U., Wgl.
8. The Head, Department of Chemistry, KU, Wgl.
9. The EXAMINER.
10. **Dr. M. Ravinder** (Supervisor), Professor of Chemistry, Chaitanya Deemed to be University, Warangal.
11. The Nodal Officer, Kakatiya University, Warangal.
12. The Member-in-Charge, University Library, Kakatiya University, Warangal.
13. The Deputy Registrar (Admn.), Kakatiya University, Warangal.
14. The Public Relations Officer, Kakatiya University, Warangal.
15. The Secretary to Vice-Chancellor, Kakatiya University, Warangal.
16. The Documentation Section (E5), Examination Branch, KU, Warangal.
- ✓ 17. The Person concerned (**Satyanarayana K S/D/o. Ananthaiah**)

(4159)



DEPARTMENT OF CHEMISTRY
KAKATIYA UNIVERSITY
WARANGAL, TELANGANA

Date: 10.09.2020

CERTIFICATE

(SEMINAR-I)

This is to certify that **Kandala Satyanarayana**, Part-time, research scholar working for his Ph.D degree under the Supervision of **Dr. M. Ravinder**, Associate Professor, Chaitanya Degree College (Autonomous) Hanamkonda given Seminar-I on his PhD topic on 10.09.2020 in the Department of Chemistry, Kakatiya University, Warangal. The topic of Seminar is "**Synthesis Characterization and Antimicrobial Activity of Metal Complexes containing Chromone Derivatives**".


10/9/2020
Supervisor


Chairperson, BOS


10/9/2020
DEAN
DEAN
Faculty of Science
Kakatiya University
Warangal-506 009 (T.S.)


10/09/2020
HEAD
HEAD
Department of Chemist
University College
KAKATIYA UNIVERSITY
WARANGAL-506 009 (T.S.)



DEPARTMENT OF CHEMISTRY
KAKATIYA UNIVERSITY
WARANGAL, TELANGANA

Date: 14.06.2021

CERTIFICATE

(SEMINAR-II)

This is to certify that **Kandala Satyanarayana** research scholar working for his Ph.D. degree under the supervision of **Dr. M. Ravinder**, Professor Department of Chemistry, Chaitanya Degree College (Autonomous) Hanamkonda, Warangal given Seminar-II on his Ph.D topic on 14.06.2021 in the Department of Chemistry, Kakatiya University, Warangal. The topic entitled with **“Synthesis, Characterization and Antimicrobial Activity of Metal Complexes containing Chromone Derivatives”**.

Supervisor

Dr. M. Ravinder
Professor of Chemistry
Chaitanya (Deemed to be University)
Kishanpura, Hanamkonda,
Warangal Urban, 506 001 (T.S.) INDIA

Chairperson, BOS
Chairman, Board of Studies in
Chemistry
KAKATIYA UNIVERSITY
Warangal-506 009 (T.S.) INDIA

HEAD

HEAD
Department of Chemistry
University College
KAKATIYA UNIVERSITY
WARANGAL - 506 009 (T.S.) INDIA

DEAN

DEAN
Faculty of Science
Kakatiya University
Warangal-506 009 (T.S.)

000



KAKATIYA UNIVERSITY

WARANGAL - 506 009 (T.S.)

MEMORANDUM OF MARKS

B 3939675

Examination

PRE-Ph. D. (CHEMISTRY) JULY, 2016

Date 29-11-2016

Candidate's Name

SATYANARAYANA K

Father's Name

ANANTHAIAH

Roll No 150001636

SUBJECT	MAXIMUM MARKS	PASS MARKS	MARKS SECURED	SUBJECT RESULT
RESEARCH METHODOLOGY	100	050	060	PASS
INORGANIC CHEMISTRY	100	050	028	FAIL
TOTAL MARKS : EIGHTY EIGHT				
RESULT : FAILED				088

NOTE: Application with prescribed fee for recounting/revaluation will be accepted only upto ten days from the date of Memorandum of Marks

Not
SECTION-IN-CHARGE

Pow...
CONTROLLER OF EXAMINATIONS

000



KAKATIYA UNIVERSITY

WARANGAL - 506 009 (T.S.)

MEMORANDUM OF MARKS

B 4441012

Examination

PRE-Ph. D. (CHEMISTRY) MARCH, 2018

Date: 25-10-2018

Candidate's Name

SATYANARAYANA K

Father's Name

ANANTHAIAH

Roll No. 150001636

SUBJECT	MAXIMUM MARKS	PASS MARKS	MARKS SECURED	SUBJECT RESULT
INORGANIC CHEMISTRY	100	050	053	PASS
TOTAL MARKS : FIFTY THREE				
RESULT : COMPLETED				053

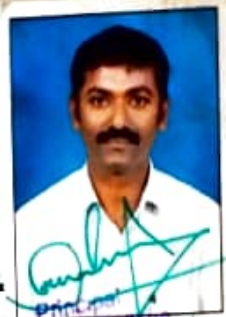
NOTE: Application with prescribed fee for recounting/revaluation will be accepted only upto ten days from the date of Memorandum of Marks

SS
SECTION-IN-CHARGE

Pow...
CONTROLLER OF EXAMINATIONS



OFFICE OF THE DEAN
Faculty of Science
 Kakatiya University: Warangal - 506 009 (T.S.), India



Ph. D. ADMISSION FORM

DEPARTMENT : CHEMISTRY

1. Research Scholar's Name : KANDALA SATYANARAYANA
 Mobile 9440228281 email Satyannarayana.kandala@gmail.com

2. Father's Name : ANANTHAIAH

3. Date of Joining : _____

4. State whether full time / Part-time : Part-time

5. Supervisor's Name : DR. M. RAVINDER
 Mobile 9951176555 email 8KU76@yahoo.co.in

6. Title of the Research : Synthesis characterization and antimicrobial activity of metal complexes containing Quinoxaline derivatives.

7. Official Address : Department of chemistry, Govt. Degree College, NARSAMPET

8. Permanent Address : H.NO. 15-186, Narsampet, Warangal Dist -506132.

Declaration

I have read all the Rules & Regulations of Ph. D. of Kakatiya University and I will abide by the same. In case the declaration is found to be untrue, I am aware that my admission is liable to be cancelled.

Forwards

Signature

Date _____

Supervisor
Dr. M. RAVINDER
 Associate Professor
 Department of Chemistry
 Chaitanya PG. College (Autonomous)
 Warangal-506 009 (T.S.) India

Head of the Department
Professor & Head
 Department of Chemistry
 University College
 KAKATIYA UNIVERSITY
 Warangal-506 009 (T.S.) India

Chairman, Board of Studies
Chairman, Board of Studies in
 Chemistry & Bio-Chemistry
 KAKATIYA UNIVERSITY
 Warangal-506 009 (T.S.) India.

Dean of Science
DEAN
 FACULTY OF SCIENCE
 KAKATIYA UNIVERSITY
 Warangal-506 009 (T.S.) India.

JOINING LETTER

Date: 0 -11-2015

To
The Principal,
University college,
Kakatiya University,
Warangal.

// (Through proper Channel) //

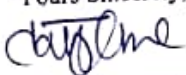
Sub: - Admission to Ph. D. Programme (Part-Time) in the Dept. of Chemistry- Submission of Joining Report - Req. - Reg.

Ref:- KU Order No. 812/DFS/KU/2015, Dated: 08-09-2015.

Respected Sir,

With reference to the subject cited, I am here with submitting my Joining Report as a Research Scholar (Part-Time) to work for my Ph. D. on the topic entitled "Synthesis Characterization and antimicrobial activity of metal complexes containing Quinoxaline derivatives", under the supervision of Dr. M. Ravindar, Department of Chemistry, Chaitanya Degree & P.G College, (Autonomous), Hanmakonda, Kakatiya University, Warangal.

Thanking you,

Yours Sincerely,

(K. Satyanarayana)

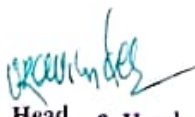
Forwarded



Research Supervisor

Dr. M. RAVINDER
Associate Professor
Department of Chemistry
Chaitanya PG. College (Autonomous)
Kishanpura, Hanmakonda, Warangal-506 009 (T.S.) India.

Forwarded



Head

Department of Chemistry
University College
KAKATIYA UNIVERSITY
Warangal-506 009 (T.S.) India


Forwarded



Chairman, BOS

Chairman, Board of Studies in
Chemistry & Bio-Chemistry
KAKATIYA UNIVERSITY
Warangal-506 009 (T.S.) India.

Forwarded



DEAN

FACULTY OF SCIENCE
KAKATIYA UNIVERSITY
WARANGAL-506 009 (A. P.)



Principal

University College
Kakatiya University
Warangal-506 009 T.S



OFFICE OF THE DEAN

Faculty of Science

Kakatiya University : : Warangal – 506 009 (T.S.), India

Prof. Khaja Althaf Hussain
Dean

Phone : (O) 0870-2461434

No. 830 /DFS/KU/2015

07-11-2015

ORDERS

Sub: Faculty of Science - Ph. D. Admissions for the Year 2012-13 - Department of Chemistry - Orders – Issued

Ref: KU Orders No:-812/DFS/KU/2015, Dated:08-09-2015

* * *

In continuation with reference order cited above Admission Committee and with the approval of the Vice-Chancellor, Kakatiya University, the following candidates have been provisionally selected for admission to the Ph.D. Programme for the year 2012-13 in the Department of Chemistry and the supervisor allotted to the selected student.

Sl. No.	Name of the Candidate	Category/ Social Status	Name of the Supervisor	Research Topic	Remarks
1	K. Satyanarayana (CDC)	BC-D	Dr. M. Ravinder (CDC)	Synthesis Characterization and antimicrobial activity of metal complexes containing Quinoxaline derivatives	Part-time

The above candidates are required to submit the following certificates in original along with "Application Form for Admission to Ph.D." to the Principal, University College, KU for verification and finalization of admission to the Ph. D. Programme.

1. Post-Graduate / M. Phil Degree Certificate
2. NET/SLET/RGNF/ Project fellow candidate, if applicable
3. Eligibility Test Result Card, if applicable
4. Transfer Certificate
5. No Objection Certificate from the Employer (applicable to employees)
6. Migration Certificate (in case of candidates who obtained PG/M. Phil degree from an institution other than Kakatiya University)
7. Applicable fees (to be specified by the office of the Principal, University College, KU and to be paid at SBH, Kakatiya University Branch, Warangal).

After getting the above certificates verified the candidates has to submit his Joining Report duly endorsed by the Supervisor, Head of the Department, Chairperson, Board of Studies and Dean, Faculty of Sciences to the Principal, University College, KU under intimation to the undersigned on or before 20-11-2015 failing which their admission will be cancelled.



The above admissions are subject to the following conditions:

The admitted candidate has to complete the Ph. D. programme within a minimum period of 2/3 years and a maximum of 4/5 years from the date of registration for full time/part time scholars respectively.

He has to renew his admission through proper channel by paying the applicable fees every year as per the norms of the office of the Principal, University College, KU and file a copy of the receipt/challan with the office of the Dean, Faculty of Science.

He should give a minimum of two (2) seminars during the programme, including one before the submission of thesis.

He should publish at least one paper on the research area concerned in a reputed/recognized journal before submission of thesis.

He should submit half-yearly progress reports on their research work through the Supervisor and Head of the Department to the undersigned.

The candidates other than M. Phil holders (in regular mode or SDLCE, KU) should undergo course work and pass Pre-Ph. D. examination within two successive attempts from the date of registration.

The in-service candidates working outside Warangal, and registered as part time scholars, are required to put in at least six months of attendance in the department.

In all other matters they shall be governed by the existing rules and regulations of the Ph. D. Programme.

Any deviation in observing the above rules by the candidates will entail cancellation of their registration.


DEAN

Copy to:

1. The Principal, University College, KU.
2. The Principal, CDC College, Hanamkonda
3. The Head, Dept. of Chemistry, KU
4. The Chairperson, Board of Studies in Dept. of Chemistry, KU
5. The Supervisors concerned
6. The Controller of Examinations, KU
7. The Member In-charge, University Library, KU
8. The Deputy Registrar, Academic Branch, KU
9. The Secretary to Vice-Chancellor, KU
10. The SF



OFFICE OF THE DEAN

Faculty of Science

Kakatiya University : : Warangal - 506 009 (T.S.), India

Prof. Khaja Althaf Hussain
Dean

Phone : (O) 0870-2461434

No. 812 /DFS/KU/2015

08-09-2015

ORDERS

Sub: Faculty of Science - Ph. D. Admissions for the Year 2012-13 - Department of Chemistry - Orders - Issued

On the recommendation of the Admission Committee and with the approval of the Vice-Chancellor, Kakatiya University, Warangal the following candidates have been provisionally selected for admission to the Ph.D. Programme for the year 2012-13 in the Department of Chemistry.

Sl. No.	Name of the Candidate	HT. No	Category/ Social Status
1.	G. Manasa	13385	BC-D
2.	M. Aruna	13215	BC-D
3.	N. Srinivas	13351	BC-B
4.	B. Kishore	13216	OC
5.	K. Dhanaja	13384	BC-D
6.	V. Naveen Kumar	13353	BC-B
7.	M. Himabindu	13008	SC
8.	K. Rajashekar	13092	ST
9. ✓	E. Jagadeesh Kumar (CDC)	13208	OC
10.	K. Satyanarayana	13019	BC-D

The above candidates are required to submit the following certificates in original along with "Application Form for Admission to Ph.D." to the Principal, University College, KU for verification and finalization of admission to the Ph. D. Programme. The candidate should submit title of the Research topic.

1. Post-Graduate / M. Phil Degree Certificate
2. NET/SLET/RGNF/ Project fellow candidate, if applicable
3. Eligibility Test Result Card, if applicable
4. Transfer Certificate
5. No Objection Certificate from the Employer (applicable to employees)
6. Migration Certificate (in case of candidates who obtained PG/M. Phil degree from an institution other than Kakatiya University)
7. Applicable fees (to be specified by the office of the Principal, University College, KU and to be paid at SBH, Kakatiya University Branch, Warangal).

After getting the above certificates verified the candidates have to submit their Joining Report duly endorsed by the Supervisor, Head of the Department, Chairperson, Board of Studies and Dean, Faculty of Sciences to the Principal, University College, KU under intimation to the undersigned on or before 28-09-2015 failing which their admission will be cancelled.

The above admissions are subject to the following conditions:

The admitted candidate have to complete the Ph. D. programme within a minimum period of 2/3 years and a maximum of 4/5 years from the date of registration for full time/part time scholars respectively.

They has to renew their admission through proper channel by paying the applicable fees every year as per the norms of the office of the Principal, University College, KU and file a copy of the receipt/challan with the office of the Dean, Faculty of Science.

They should give a minimum of two (2) seminars during the programme, including one before the submission of thesis.

They should publish at least one paper on the research area concerned in a reputed/recognized journal before submission of thesis.

They should submit half-yearly progress reports on their research work through the Supervisor and Head of the Department to the undersigned.

The candidates other than M. Phil holders (in regular mode or SDLCE, KU) should undergo course work and pass Pre-Ph. D. examination within two successive attempts from the date of registration.

The in-service candidates working outside Warangal, and registered as part time scholars, are required to put in at least six months of attendance in the department.

In all other matters they shall be governed by the existing rules and regulations of the Ph. D. Programme.

Any deviation in observing the above rules by the candidates will entail cancellation of their registration.


DEAN

Copy to:

1. The Principal, University College, KU.
2. The Head, Dept. of Chemistry, KU
3. The Chairperson, Board of Studies in Dept. of Chemistry, KU
4. The Supervisors concerned
5. The Controller of Examinations, KU
6. The Member In-charge, University Library, KU
7. The Deputy Registrar, Academic Branch, KU
8. The Secretary to Vice-Chancellor, KU
9. The SF



OFFICE OF THE DEAN
FACULTY OF SCIENCE
Kakatiya University, Warangal – 506 009 (T.S.), India
(Accredited with "A" Grade by the NAAC)

Prof. A. Rajendra Prasad

Dean

Phone: (O) 0870 – 2461434

Professor of Statistics

No.27 DFS KUW 2020

Date: 03/11/2020

ORDERS

Sub: Faculty of Science – Department of Chemistry Mr. K. Satyanarayana Research Scholar – Change of title of thesis approved – Orders – issued.

- Ref:** 1. Application of the Research Scholar dated 10-03-2020 duly forwarded by the supervisor, Head of the Department and the Chairperson, BOS concerned.
2. KU Orders No.812/DFS/KU/2015 dated 08-09-2015
3. KU Orders No.830/DFS/KU/2015 dated 07-11-2015

* * *

The Vice-Chancellor, Kakatiya University, Warangal is pleased to accord permission to **Mr. K. Satyanarayana**, Research Scholar, Department of Chemistry, Kakatiya University for the change of title of his Ph.D. thesis from

"SYNTHESIS, CHARACTERIZATION AND ANTIMICROBIAL ACTIVITY OF METAL COMPLEXES CONTAINING QUINOXALINE DERIVATIVES"

TO

"SYNTHESIS, CHARACTERIZATION AND ANTIMICROBIAL ACTIVITY OF METAL COMPLEXES CONTAINING CHROMONE DERIVATIVES"

A. Prasad
DEAN
03.11.2020

To

Mr. K. Satyanarayana,
Research Scholar,
Department of Chemistry,
Kakatiya University.

Copy to:

1. The Principal, University College, KU
2. The Head, Department of Chemistry, KU
3. The Chairperson, Board of Studies in Chemistry, KU
4. Dr. M. Ravinder (Supervisor), Department of Chemistry, CDC
5. The Controller of Examinations, KU



ISSN: 0017-2294

GORTERIA

UGC-CARE (Group-II) Journal

PAPER ID: GRTJ-P754

Certificate of Publication

This is to certify that the paper entitled

Synthesis, characterization, and antimicrobial activity of novel Schiff bases and their Ni (II) metal complexes

Authored by

Satyanarayana Kandala

Department of Chemistry, Kakatiya University, Warangal, TS-506 009, India.

Has been published in

VOLUME 34, ISSUE 4, APRIL - 2021



Synthesis, characterization, and antimicrobial activity of novel Schiff bases and their Ni (II) metal complexes

Satyanarayana Kandala^a and Ravinder Manchal^{ab*}

^aDepartment of Chemistry, Kakatiya University, Warangal, TS-506 009, India

^bDepartment of Chemistry, Chaitanya Deemed to be University, Warangal, TS-506 001, India

Abstract:

Chromone based Schiff bases and their Ni (II) metal complexes were synthesized from 3-formyl chromone and amino methylpyridines. Schiff base ligands and their metal complexes were characterized systematically by spectroscopic techniques (NMR, IR, UV, and HRMS), magnetic moment and elemental analysis. Spectroscopic and magnetic moment studies revealed that Ni(II) complexes have octahedral geometry. The complexes have screened for their *in vitro* anti-bacterial and anti-fungal activity compared with standard drugs streptomycin and fluconazole. [Ni(L₃)₂(H₂O)₂] complex has shown significant growth inhibitory activity against selected types of bacteria strains *S. aureus* and *K. pneumonia* than the ligands and [Ni(L₂)₂(H₂O)₂] complex has exhibited moderate anti-bacterial activity. Further, [Ni(L₃)₂(H₂O)₂] has shown excellent antifungal activity against *A. Niger* and *A. Flavus*.

Keywords: Schiff base, 3-formyl chromone, anti-bacterial activity, anti-fungal activity, Metal complexes.

INTRODUCTION

Nickel is one of transition metals and abundance in nature as nickel (II) because more stable than 0 to IV oxidation states (Earnshaw and Greenwood 1997; Lee 1994). The geometry formed by the nickel (II) complex varies, including square planar [Güveli et al. 2016], tetrahedral (Alhazmi and Elmetwally 2017), trigonal bipyramidal (Craig et al. 2018), and octahedral (Wang et al. 2018). Meanwhile, the most common of the nickel (II) complex geometry are square planar and octahedral.



ISSN: 0017-2294

GORTERIA

UGC-CARE (Group-II) Journal

PAPER ID: GRTJ-P785

Certificate of Publication

This is to certify that the paper entitled

**Novel 3-Formylchromone Schiff bases containing Co (II) metal complexes:
Synthesis, characterization and evaluation of biological activity**

Authored by

Satyanarayana Kandala

Department of Chemistry, Kakatiya University, Warangal, TS-506 009, India.

Has been published in

VOLUME 34, ISSUE 5, MAY - 2021



Gerand Willem
Gerand Willem
Editor-In-Chief



**Novel 3-Formylchromone Schiff bases containing Co (II) metal complexes:
Synthesis, characterization and evaluation of biological activity**

Satyanarayana Kandala^a and Ravinder Manchala^{b*}

^a*Department of Chemistry, Kakatiya University, Warangal, TS-506 009, India*

^b*Department of Chemistry, Chaitanya Deemed to be University, Warangal, TS-506 001, India*

Abstract

A series of anti-bacterial and anti-fungal chromone schiff base scaffolds and their Co (II) metal complexes have been synthesized and characterized with spectroscopic techniques NMR, IR, UV-vis and HRMS magnetic moment and elemental analysis. Magnetic susceptibility measurements, IR and electronic spectral data suggest a six-coordinated octahedral geometry for these complexes. The magnetic moment values of all Co (II) complexes can be found between 3.92 – 3.98 BM. The complexes were screened for their anti-bacterial and anti-fungal activity study. The results were compared with standard drugs fluconazole and streptomycin. Complex [Ni (L3)₂(H₂O)₂] has shown outstanding anti-bacterial activity against four tested strains *S. aureus*, *B. Subtilis*, *K. pneumonia*, *E. coli*. And good antifungal activity against the *C. albicans*, *Aspergillus Niger*, and *C. oxysporum*.

KeyWords: Schiff bases, Co (II) metal complexes, 3-formyl chromone,, Anti-bacterial activity, anti-fungal activity

**SYNTHESIS, CHARACTERIZATION AND ANTIMICROBIAL
ACTIVITY OF METAL COMPLEXES CONTAINING
CHROMONE DERIVATIVES**



**THESIS SUBMITTED TO THE KAKATIYA UNIVERSITY
FOR THE AWARD OF THE DEGREE OF**

Doctor of Philosophy

**IN
CHEMISTRY**

By

KANDALA SATYANARAYANA

M.Sc.

Under the Supervision of

Dr. M. RAVINDER

Professor

Recognized

Research Supervisor

By

DEPARTMENT OF CHEMISTRY

KAKATIYA UNIVERSITY

WARANGAL - 506 009

(T.S.) INDIA

2021