



Department : Chemistry		
Academic Year : 2024-25		
Sr. No.	Programme Code	Name of the Programme
01.	2136	B. Sc. Chemistry

Contents

S. N.	Name of Student	Page No.
1.	Anjali Khunte	1-3
2.	Sankalp Singh Paleria	4-8
3.	Shreyash Pandey	9-11
4.	Yogita Verma	12-14
5.	Bhawana Narmada	15-17
6.	Girdhar Kumar	18-20
7.	Prakhar Mishra	21-24
8.	Prahlad Kumar Pandey	25-27
9.	Durgesh Patel	28-30
10.	Tanmay Patel	31-33
11.	Esha Patel	34-36
12.	Chand	37-39
13.	Tejas Yadav	40-42
14.	Manshi Singh	43-49
15.	Mithlesh Kumar Chandra	50-53
16.	Nageshwari Sahu	54-56
17.	NIDHI SHUKLA	57-59
18.	Borangi Tushara	60-62
19.	Rajesh Chandra	63-65

गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर - 495009 (छ.ग.)



Guru Ghasidas Vishwavidyalaya
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)
Koni, Bilaspur - 495009 (C.G.)

20.	Samiksha Yadav	66-68
21.	Saumya Mishra	69-71
22.	Shruti Goswami	72-74
23.	SURBHI SHUKLA	75-78
24.	Chitranshi Mandavi	79-82
25.	Sneha Singh Rajput	83-85
26.	Sakshi Tanwar	86-88
27.	Garima Yadav	89-90

सहायक/Head
रसायन शास्त्र विभाग
Deptt. of Chemistry
गुरु घासीदास विश्वविद्यालय,
Guru Ghasidas Vishwavidyalaya,
बिलासपुर 495009 (छ.ग.)
Bilaspur 495009 (C G.)

Signature and Seal of the Head

GREEN SYNTHESIS AND CHARACTERIZATION OF POLY LACTIC ACID

B.Sc. Project Report

By

Anjali Khunte

(Roll No.: 22103106)



Department of Chemistry

Guru Ghasidas Vishwavidyalaya Bilaspur (C.G.) India

mobile no - 7067481397

E-mail - akkhunte1311@gmail.com

Enrollment no - GGV/22/07006

AK
9/5/25

Certificate

It is to certify that the work in the project report titled "Green synthesis and characterization of poly lactic acid (PLA) Biopolymer Film from natural sources" by Anjali Khunte has been approved under my supervision that this work has not been submitted elsewhere


Prof. Khemchand Dewangan

Project Supervisor

Department of Chemistry

Guru Ghasidas Vishwavidyalaya

Bilaspur (C.G.)


Prof. Khemchand Dewangan

Head of Department

Department of Chemistry

Guru Ghasidas vishwavidyalaya Bilaspur (C.G.)

Table of Content

Abstract

Chapter 1. Introduction

- 1.1 Overview of biodegradable polymers.
- 1.2 Importance of PLA in sustainable materials.
- 1.3 Objectives and scope of the study.
- 1.4 Physical and Chemical Properties of PLA

Chapter 2. Literature Review

- 2.1 Historical development of PLA.
- 2.2 Recent advancements in PLA applications.
- 2.3 Challenges and limitations in current research.
- 2.4 Incorporate recent studies , such as:
 - .Medical applications and prospects of PLA Materials.
 - Advances in PLA Nano composites.

Chapter 3. Materials and Methodology

- 3.1 Materials Used
- 3.2 Preparation Method for PLA film.
- 3.3 Analytical Techniques: UV-Vis spectroscopy.
- 3.4 Modification in Methodology.

B.Sc. REVIEW WRITING REPORT

ON

**Application of low-cost adsorbent for dye
removal using agricultural waste**



SUBMITTED TO

**GURU GHASIDAS VISHWAVIDYALAYA (A CENTRAL UNIVERSITY)
KONI, BILASPUR, (C.G.), INDIA, 495009**

FOR THE AWARD OF DEGREE OF

BACHELOR OF SCIENCE (Hons.)

IN

CHEMISTRY

BY

**Sankalp Singh Paleria
(Enrollment No.: GGV/22/07051)**

SUPERVISOR

Prof. Charu Arora

DEPARTMENT OF CHEMISTRY

**SCHOOL OF STUDIES OF INTERDISCIPLINARY EDUCATION AND RESEARCH
GURU GHASIDAS VISHWAVIDYALAYA (A CENTRAL UNIVERSITY)
KONI, BILASPUR, (C.G.), INDIA, 495009**

2025

DECLARATION BY THE CANDIDATE

I hereby declare that this B.Sc. Review Writing report entitled “**Application of low-cost adsorbent for dye removal using agricultural waste,**” is my original research work carried under the supervision of Prof. Charu Arora, Department of Chemistry, School of Studies of Interdisciplinary Education and Research, Guru Ghasidas Vishwavidyalaya (A Central University), Koni, Bilaspur, (C.G.), India, 495009.

The particulars given in this report are true and authentic to the best of my knowledge and belief.

Date: 09-05-2025

Place: Bilaspur

Sankalp Singh Paleria
B.Sc. (Hons.) Chemistry, Semester-VI
Enrollment No: GGV/22/07051



Department of Chemistry
Guru Ghasidas Vishwavidyalaya, Koni, Bilaspur, (C.G.), India, 495009
(A Central University Established by the Central University Act, 2009 No. 25 of 2009)

CERTIFICATE

This is to certify that the B.Sc. Review Writing report entitled “**Application of low cost adsorbent for dye removal using agricultural waste,**” submitted by **Sankalp Singh Paleria** (Enrollment No.: GGV/22/07051) *for the award of the degree of **Bachelor of Science (Hons.) in Chemistry*** is carried out under the supervision of Dr. Charu Arora, Department of Chemistry, School of Studies of Interdisciplinary Education and Research, Guru Ghasidas Vishwavidyalaya (A Central University), Koni, Bilaspur, (C.G.), India, 495009.

Prof. Charu Arora

Prof. K Dewangan
Professor and Head of
Department

ACKNOWLEDGEMENTS

First and foremost, I wish to express my deepest gratitude to my mentor and supervisor, Dr. Charu Arora, Assistant Professor, Department of Chemistry, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, C.G., for his invaluable guidance, constant support, and utmost encouragement throughout the duration of my coursework.

I wish to Sincerely thank Prof. Charu Arora, Professor and Head, Department of Chemistry, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, C.G. for providing me with the opportunity and resources to undertake the B.Sc. Review Writing coursework.

I am deeply thankful to the faculty and staff of the Department of Chemistry, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, C.G., for their direct or indirect assistance and support during my coursework.

I am also thankful to my family and friends for their understanding, encouragement, and support.

Lastly, I acknowledge that the work presented in this report is a result of the cooperation and support of many individuals who may not be mentioned here, but I am sincerely grateful. I extend my thanks to all of them.

Date: 09-05-2025

Place: Bilaspur

Sankalp Singh Paleria
B.Sc. (Hons.) Chemistry, Semester-VI
(Enrollment No.: GGV/22/07051)

TABLE OF CONTENTS

Entry	Content	Page No.
1.	1.ABSTRACT 2. INTRODUCTION	6-7
2.	3. LITERATURE REVIEW	7-8
3.	4. AIMS & OBJECTIVES	8
4.	5. MATERIALS AND METHODS	8
5.	6. RESULT AND DISCUSSION	9-12
6.	7. REFERENCES	13-14

A
Literature Based Project Report
ON

*A Review on Wittig and Ylide-Mediated
Strategies for Alkene Synthesis: A Modern
Perspective*

*Submitted for
Partial Fulfillment of the Requirement for the Degree of
Bachelor of Science in Chemistry*

Session: 2024-2025

SUPERVISED BY
Dr. Subhash Banerjee
Associate Professor
Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur (C.G.)

SUBMITTED BY
Shreyash Pandey
B. Sc. (Chemistry)
(Sixth Semester)
Enroll No. GGV/22/07056
Roll no. 22103156



Department of Chemistry
Guru Ghasidas Vishwavidyalaya
(A Central University)
Bilaspur (C.G.) 495009, India



Department of Chemistry
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)
(A Central University)

CERTIFICATE

This is to certify that **SHREYASH PANDEY** has carried out this literature survey-based project under my supervision in the Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) on the topic "A REVIEW ON THE WITTIG AND YLIDE-MEDIATED STRATEGIES FOR ALKENE SYNTHESIS: A MODERN PERSPECTIVE".

He has worked diligently, methodically and also collected the literature very sincerely and carefully. During this project work he has learnt about various organic synthesis related to the entitled topic.

To the best of our knowledge the work presented in this project is original and has not been submitted anywhere. I recommend the project report to be forwarded to the respective examiners for evaluation. I wish every success in his career and life.

SUBMITTED BY *Shreyash Pandey*
SHREYASH PANDEY
BSc. Chemistry
VI Semester
Enroll No. GGV/22/07056
Roll no. 22103156

SUPERVISED BY
Dr. Subhash Banerjee
Dr. Subhash Banerjee
Associate Professor
Department of Chemistry
GGV, Bilaspur (C.G.)

CONTENTS

Serial No.	Contents	Page No.
	Abstract and Introduction	1-2
1	Basic idea of Wittig reaction	2-4
2	Preparation methods for different ylides	4-6
3	Aza-Wittig reaction	7
4	Metal-assisted phospho-Wittig reaction	8-10
5	Catalytic Wittig reactions	10-12
6	Phosphine catalysed Wittig reaction	12
7	Wittig reactions by α -Metalated Ylides	13-15
8	Boron-Wittig reaction	15-16
9	Wittig/B-H insertion reaction	16-19
10	Sulphur ylides and their reactions	19-22
11	References	23-26

A Review on Synthesis and Application of Imidazopyridine derivatives

A

Literature Based Project Report

ON

*A Review on Synthesis and Application of
Imidazopyridine derivatives*

Submitted for

Partial Fulfillment of the Requirement for the Degree of

Bachelor of Science in Chemistry

Session: 2024-2025

SUPERVISED BY
Dr. Subhash Banerjee
Associate Professor
Guru Ghasidas Vishwavidyalaya

SUBMITTED BY
Yogita Verma
B. Sc. (Chemistry)
(Sixth Semester)
Enroll No. GGV/16/7106
Roll no. 22103168



Department of Chemistry
Guru Ghasidas Vishwavidyalaya
(A Central University)
Bilaspur (C.G.) 495009, India

Yogita Verma
9/5/25



Department of Chemistry
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)
(A Central University)

CERTIFICATE

This is to certify that YOGITA VERMA has carried out this literature survey-based project under my supervision in the Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) on the topic "A REVIEW ON THE SYNTHESIS AND APPLICATION OF IMIDAZOPYRIDINE DERIVATIVES".

She has worked diligently, methodically and also collected the literature very sincerely and carefully. During this project work she has learnt about various organic synthesis related to the entitled topic.

To the best of our knowledge the work presented in this project is original and has not been submitted anywhere. I recommend the project report to be forwarded to the respective examiners for evaluation. I wish every success in her career and life.

SUBMITTED BY

Yogita Verma
YOGITA VERMA

B. Sc. Chemistry

VI Semester

Enroll No. GGV/22/07068

Roll no. 22103168

SUPERVISED BY

Dr. Subhash Banerjee
Dr. Subhash Banerjee

Associate Professor

Department of Chemistry

GGV, Bilaspur (C.G.)

CONTENTS

CHAPTER No.	Contents	Page No.
CHAPTER 1	Introduction	
1.1	General Introduction	8
1.2	Importance of imidazo[1,2-a] pyridine	8-9
1.3	Applications of imidazo[1,2-a] pyridines	10-15
CHAPTER 2	Review on the synthesis of imidazopyridine	16-26
CHAPTER 3	Conclusions	27-28
CHAPTER 4	References	29-33

A Review on the Applications of Oxone in Organic Synthesis

A Project submitted to

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)



In partial fulfillment

For the award of the degree

Of

**Bachelor of Science
in**

Chemistry

by

Bhawana Narmada

Under the Guidance of

Dr. Subhash Banerjee

Research center

Department of Chemistry,

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

May 2025


9/5/25



CERTIFICATE OF THE SUPERVISOR

This is to certify that the work incorporated in the major project "*A Review on the Applications of Oxone in Organic Synthesis*", is a record of research work carried out by *Bhawana Narmada* bearing RollNo.22103110, Enrollment No. GGV/22/07010 under my guidance and supervision for the award of Degree of the *Bachelor of Science* in Chemistry in the Guru Ghasidas Vishwavidyalaya, Bilaspur, (CG) India.

To the best of my knowledge and belief the major dissertation synopsis i) Embodies the work of the candidate herself, ii) Has duly been completed, iii) Fulfils the requirement of the Ordinance relating to the Bachelor of Science in Chemistry degree of the University is up to the desired standard both in respect of contents and language for being referred to the examiners.

(Signature of the Supervisor)

Dr. Subhash Banerjee
Associate Professor
Department of Chemistry,
G.G.V. Bilaspur (C.G)

Carbon – Carbon Bond Formation via Coupling Reaction

A Project submitted to

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)



In partial fulfillment

For the award of the degree

Of

**Bachelor of
Science**

Chemistry

by

Girdhar Kumar

Under the Guidance of

Dr. Subhash Banerjee

Research center

Department of Chemistry,

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)


915125



CERTIFICATE OF THE SUPERVISOR

This is to certify that the work incorporated in the major project "*Carbon – Carbon Bond Formation via Coupling Reaction*", is a record of research work carried out by *Girdhar Kumar* bearing Roll No. 22103123, Enrollment No. GGV/22/07023 under my guidance and supervision for the award of Degree of the *Bachelor of Science* in Chemistry degree at the Guru Ghasidas Vishwavidyalaya, Bilaspur, (CG) India.

To the best of my knowledge and belief the major dissertation synopsis i) Embodies the work of the candidate himself, ii) Has duly been completed, iii) Fulfils the requirement of the Ordinance relating to the Bachelors of Science in chemistry degree of the University is up to the desired standard both in respect of contents and language for being referred to the examiners.

(Signature of the Supervisor)

Dr. Subhash Banerjee
Associate Professor
Department of Chemistry, G.G.V. Bilaspur (C.G)

**Design of a Schiff Base chemo sensor for
Rapid Colorimetric and Turn-On
Fluorescence Sensing of Zn²⁺**

A Project Report Submitted

To

Guru Ghasidas Vishwavidyalaya, Bilaspur



*In Partial Fulfillment to the Requirement for the degree of
Bachelor of Science*

In

Chemistry

SUBMITTED BY

PRAKHAR MISHRA

SUPERVISOR

DR. GOUTAM KUMAR PATRA

Department Of Chemistry

Guru Ghasidas Vishwavidyalaya, Bilaspur - 495009(C.G)

hk.
7/5/25



रसायन विज्ञान

Department of Chemistry

गुरु घासीदास विश्वविद्यालय, बिलासपुर-495009, छत्तीसगढ़

Guru Ghasidas Vishwavidyalaya, Bilaspur-495009, Chhattisgarh

(A Central University established by the Central University Act 2009 No. 25 of 2009)

<https://www.new.ggu.ac.in/>



Dr. Goutam Kumar Patra

Professor

Dept. of Chemistry

Department of Chemistry

Guru Ghasidas university

C.G Bilaspur – 495009

E-MAIL: patra29in@yahoo.co.in

Phone: 9433378801

CERTIFICATE

This is to certify that PRAKHAR MISHRA has completed the project work entitled "Design of a Schiff Base Chemosensor for Rapid Colorimetric and Turn-On Fluorescence Sensing of Zn²⁺ under my supervision for the partial fulfillment of required degree of "Bachelor of science".

I wish his every success in the future life

Date: 09/08/25


Signature

Place: Bilaspur

CONTENTS

1. Abstract

2. Introduction

2.1 Schiff base

2.2 chemosensor

3. Literature Review

4. Aim and Objective

5. Experimental Part

5.1 MATERIALS AND GENERAL INFORMATION

5.2 Synthesis and Characterization of Ligand

5.3 Metal Ion Sensing

6. NMR SPECTROSCOPY

6.1 FTIR SPECTROSCOPY

6.2 Photophysical MEASUREMENTS

6.3 FLOUROSCENCE TITRATION

6.4 Stoichiometric Determination

7. Result And Discussion

8. Conclusion

9. About ligand

10. Reference



**An *o*-Vanillin-Based Schiff Base Chemosensor for
Colorimetric and Fluorescence *Turn-Off* Detection of
 Ni^{2+} Ions"**

A Project Report Submitted
to
Guru Ghasidas Vishwavidyalaya, Bilaspur



In partial fulfilment to the requirement for the degree of

Bachelor of Science
in
Chemistry

Submitted by
Prahlad Kumar
Pandey

Supervisor .
Dr.Goutam Kumar
Patra

Department of Chemistry

Guru Ghasidas Vishwavidyalaya, Bilaspur-495009(C.G.) (2025)

JK
9/5/25



रसायन विज्ञान
Department of Chemistry

गुरु घासीदास विश्वविद्यालय, बिलासपुर-495009, छत्तीसगढ़
Guru Ghasidas Vishwavidyalaya, Bilaspur-495009, Chhattisgarh
(A Central University established by the Central University Act 2009 No. 25 of 2009)
<https://www.new.ggu.ac.in/>



Dr. Goutam Kumar Patra
Professor
Department of Chemistry

Department of chemistry
Guru Ghasidas University
Email ID - gkpatra2021@gmail.com
MO. No - 9433378801,7587312992

CERTIFICATE

*This is to certify that **Prahlad Kumar Pandey** has completed the project work entitled 'An o-Vanillin-Based Schiff Base Chemosensor for Colorimetric and Fluorescence Turn-Off Detection of Ni²⁺ Ions' 'under my supervision for the partial fulfillment of required degree of "Bachelor of Science".*

I wish his every success in the future life.

Date: 09/05/25

Place: Bilaspur


Signature

CONTENT'S

1. Abstract
2. Introduction
 - 2.1 Schiff based
 - 2.2 Chemo sensor
3. Literature review
4. Aim and objective
5. Experimental part
 - 5.1 Material and general information
 - 5.2 Synthesis and sherardization
 - 5.3 Metal ion sensing
- 6 NMR Spectroscopy
 - 6.1 Photophysical and Measurement
7. Results and discussion
8. About legend
9. Conclusion
10. Reference

Design of a Schiff Base Chemosensor for Dual Optical Sensing of Zn²⁺ Ion

A Project Report Submitted to

Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.



In partial fulfillment of the requirement for the degree of

**Bachelors of Science
In
Chemistry**

Submitted by

Durgesh Patel

B.Sc. 6th Sem

Enrollment No. - GGV/22/07020

Roll No.- 22103120

Supervisor

Prof. Goutam Kumar Patra

Professor

Department of Chemistry

Guru Ghasidas Vishwavidyalaya

MAY 2025

G.K.P.
9/5/25

Guru Ghasidas Vishwavidyalaya

(A Central University established under Central Universities Act 2009)

Prof. Goutam Kumar Patra
Professor



Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur-495009, C.G.

CERTIFICATE

This is to certify that *Durgesh Patel* has completed the project dissertation entitled as "*Design of a Schiff Base Chemosensor for Dual Optical Sensing of Zn²⁺ Ion*" under my supervision for the partial fulfillment of required degree of "*Bachelors of Science in Chemistry*".

He has worked diligently, methodically and also collected the literature very sincerely. During this project work he has learnt about various aspects of chemical science to the entitled topic.

To the best of my knowledge and belief of the project

- 1) is original and has not been submitted anywhere for award of any degree.
- 2) Fulfils the requirement of the Ordinance relating to the B.Sc. degree of the university.

I wish his every success in the future life.

Date: 09/05/25

Place: Bilaspur, C.G.

Signature of the Supervisor

CONTENTS

Abstract

1. Introduction

- 1.1. Chemical Reactions Involved in Schiff Base Formation
- 1.2. Structural Aspects of Schiff Bases
- 1.3. Interaction of Metal with Schiff Base Complexes
- 1.4 Zn^{2+} Selectivity and Importance in Chemosensing

2. Experimental Section

- 2.1 General Information and Materials
- 2.2 Synthesis and Characterization of Ligand
- 2.3 NMR Spectroscopic Characterization
- 2.4 UV-Visible Spectroscopy
- 2.5 Fluorescence Titration
- 2.6 Stoichiometric Determination via Job's Plot

3. Results and Discussion

- 3.1 Synthesis of Ligand
- 3.2 NMR Spectroscopic Characterization
- 3.3 UV-Visible Studies of the Probe Ligand
 - 3.3.1 UV-Vis Titration with Metal
 - 3.3.2 Determination of Limit of Detection (LOD)
 - 3.3.3 Reversibility of Metal Binding
- 3.4 Fluorescence Spectroscopic Studies
 - 3.3.1 Fluorescence Titration with Metal
 - 3.3.2 Fluorescence LOD Determination
- 3.5 Job's Plot Measurement
- 3.6 Interference (Selectivity) Study

4. Conclusion

5. References

**"Colorimetric and Turn-Off Fluorometric
Detection of Ni (II) using a Novel Schiff Base
Chemosensor"**

A Project Report Submitted to

Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.



*In partial fulfillment of the requirement for the degree of
Bachelors of Science
In
Chemistry*

Submitted by

Tanmay Patel

B.Sc. 6th Semester

Enrollment No.-GGV/22/07062

RollNo. - 22103162

Supervisor

Prof. Goutam Kumar Patra

(Professor)

Department of Chemistry

Guru Ghasidas Vishwavidyalaya

MAY 2025

Prof. Goutam Kumar Patra
Professor



Department of Chemistry
Guru Ghasidas
Vishwavidyalaya
Bilaspur-495009, C.G.

CERTIFICATE

This is to certify that *Tanmay Patel* has completed the project dissertation entitled as "Colorimetric and Turn-Off Fluorometric Detection of Ni (II) using a Novel Schiff Base Chemosensor" under my supervision for the partial fulfillment of required degree of "Bachelors of Science in Chemistry".

He has worked diligently, methodically and also collected the literature very sincerely. During this project work he has learnt about various aspects of chemical science entitled topic.

To the best of my knowledge and belief of the project

- 1) Is original and has not been submitted anywhere for award of any degree.
- 2) Fulfils the requirement of the Ordinance relating to the B.Sc.degree of the university.

I wish his every success in the future life.

Date: 09/05/2025

Place: Bilaspur, C.G.

Signature of the Supervisor

CONTENT

• Abstract	07
• Introduction	08-12
○ Nickel	
○ Schiff Base	
○ Chemosensor	
• Literature Review	12-13
• Aims and Objectives	14
• Experimental Section	14-16
○ General information and materials	
○ Synthesis and Characterization	
○ UV-Vis Titration	
○ Fluorescence Titration	
○ Job plot measurement	
○ Interference	
• Result and Discussion	16-25
○ Synthesis of L	
○ UV-Vis studies of probe L	
○ Fluorescence studies of probe L	
○ Reversibility	
○ Jobs plot	
○ Interference	
○ Proposed binding mode	
• About Ligand	25
• Conclusion	25-26
• Reference	26-30

Dual-Mode Detection of Ni²⁺ Using a Triazole-Linked Schiff Base: Colorimetric and Turn-On Fluorometric Sensing

A Project Report Submitted to

Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.



*In partial fulfillment of the requirement
For the degree of
Bachelors of Science
In
Chemistry*

Submitted by

Esha Patel

B.Sc.6thSem

Enrollment No.-GGV/22/07021

RollNo.-22103121

Supervisor

Prof. Goutam KumarPatra

Professor

Department of Chemistry

Guru Ghasidas Vishwavidyalaya

MAY 2025

Tha
9/5/25

Guru Ghasidas Vishwavidyalaya

(A Central University established under Central Universities Act 2009)

Prof. Goutam Kumar Patra
Professor



Department of Chemistry
Guru Ghasidas
Vishwavidyalaya
Bilaspur-495009, C.G.

CERTIFICATE

This is to certify that *Esha Patel* has completed the project dissertation entitled as "**1-2-diphenyl-N¹,N²-di(4H-1,2,4-triazol-4-yl)ethane-1,2-diimine: Synthesis and Spectroscopic Characterization**" under my supervision for the partial fulfillment of required degree of "*Bachelors of Science in Chemistry*".

She has worked diligently, methodically and also collected the literature very sincerely. During this project work he has learnt about various aspects of chemical science to the entitled topic.

To the best of my knowledge and belief of the project

- 1) Is original and has not been submitted anywhere for award of any degree.
- 2) Fulfils the requirement of the ordinance relating to the B.Sc. degree of the university.

I wish her every success in the future life.

Date: 09/08/25

Place: Bilaspur, C.G.


Signature of the Supervisor

TABLE OF CONTENTS

S.No.	Content	Page No.
1.	Abstract	07
2.	Introduction	08-10
3.	Literature Review	11-12
4.	Aims and objectives	12
5.	Experimental section	12-21
6.	Conclusion	22
7.	References	23-24

Guru Ghasidas Vishwavidyalaya, Koni, Bilaspur, (495009) C.G.



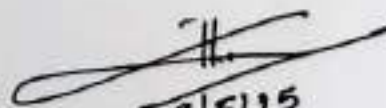
Enzyme as a Biocatalyst

A Project report submitted to
In partial fulfillment of the requirement for the degree of

Bachelor of Science
In
Chemistry
Session -2024-25

Guided By
Dr. Bhaskar Sharma
Assistant professor
Department of Chemistry

Submitted By
Chand
B.Sc. 6th Sem
Roll no.- 22103113


9/5/25



Dr. KHEMCHAND DEWANGAN

Head of the department

Department of chemistry

Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G. [A
Central University]

Forwarding Certificate

This is certified that **CHAND** (B.Sc. Semester -6th Chemistry) has been completed a project on "**ENZYME AS A BIOCATALYST**" under the supervision of Dr. BHASKAR SHARMA. This project work is submitted for the partial fulfillment of required degree in chemistry and forwarded to Examiner for evaluation.

I wish her every success in the future life.

Signature

Dr. KHEMCHAND DEWANGAN

अध्यक्ष/Head
रासायन विभाग
Dept. of Chemistry
गुरु गणेशदास विश्वविद्यालय,
Bilaspur 485009 (B.S.)
बिलासपुर 485009 (B.S.)
बिलासपुर 485009 (C.G.)

Content

S.No.	Topic	Page No.
1.	Introduction	02
2.	Etymology and history	02-03
3.	Enzyme classification and nomenclature	03-05
4.	Enzyme synthesis and structure	06-09
5.	Enzyme catalyst organic redox reaction	09-11
6.	General properties of enzymes	11-12
7.	Factors affecting enzyme biocatalysts reactions	12-13
8.	Application of enzymes as a biocatalysts	13-14
9.	Conclusion	14
10.	References	15-16

**Evaluation of Parthenium ash as an Adsorbent for the
Removal of Malachite Green from Wastewater**

A Project Report Submitted to

Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.



**This dissertation is submitted in partial fulfilment of
the requirements for the degree of**

Bachelor of Science

in

Chemistry

May 2025

Submitted by

Tejas Yadav

B.Sc. 6th Sem

Roll No. 22103163

Supervisor

Dr. Charu Arora

(Professor)

Department of Chemistry

Guru Ghasidas Vishwavidyalaya

(A Central University established under Central Universities Act 2009)



Tejas Yadav

B.Sc. 6th Sem Roll

No. 22103163

Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur-495009, C.G.

DECLARATION

I, **TEJAS YADAV**, hereby declare that the project dissertation entitled "**Evaluation of Parthenium ash as an Adsorbent for the Removal of Malachite Green from Wastewater**" is submitted as partial fulfilment of B.Sc. in Chemistry. The project work has been performed in the Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur under the supervision of **Prof. Charu Arora**.

I hereby declare that, to the best of my knowledge, this project is an original work and does not contain any material that has been previously submitted for the award of any degree at this University or any other educational institution, without proper citation and acknowledgement. I further affirm that this project is my own original work and will remain the intellectual property of the Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.).

Signature of the Candidate

Date: 9/05/25

Place: **Bilaspur, C.G.**

Guru Ghasidas Vishwavidyalaya

(A Central University established under Central Universities Act 2009)

Prof Charu Arora
Professor
Dept. of Chemistry



Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur-495009, C.G.

CERTIFICATE

This is to certify that *Mr. Tejas Yadav* has completed the project dissertation entitled "*Evaluation of Parthenium ash as an Adsorbent for the Removal of Malachite Green from Wastewater*" under my supervision for the partial fulfilment of required degree of "*Bachelor of Science in Chemistry*". Throughout this project, he has demonstrated diligence, a methodical approach, and a sincere commitment to collecting and reviewing relevant literature. In the process, he has gained a comprehensive understanding of various aspects of chemical science related to the topic at hand.

To the best of my knowledge and belief of the project

- 1) is original and has not been submitted anywhere for award of any degree.
- 2) Fulfill the requirement of the Ordinance relating to the B.Sc. degree of the university.

I wish him every success in the future life.

Date: 9.5.25

Place: Bilaspur, (C.G)

Charu Arora

Signature of the Supervisor

Guru Ghasidas Vishwavidyalaya

(A Central University established under Central Universities Act 2009)



Prof. K.D Dewangan
Head of the Department

Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur - 495009, C.G.

FORWARDING CERTIFICATE

This is to certify that *Mr. Tejas Yadav* has completed the project work entitled as "*Evaluation of Parthenium ash as an Adsorbent for the Removal of Malachite Green from Wastewater*" under the supervision of *Prof Charu Arora*, for the partial fulfilment of required degree of "*Bachelor of Science in Chemistry*".

To the best of my knowledge and belief of the project

- 1) is original and has not been submitted anywhere for award of any degree.
- 2) Fulfills the requirement of the Ordinance relating to the B.Sc. degree of the university.

I recommend the project report be forwarded to the respective examiners for evaluation.

Date:


Signature of the H.O.D.
राष्ट्रीय रासायन विभाग

Deptt. of Chemistry
गुरु गहासदा विश्वविद्यालय,
गुरु गहासदा विश्वविद्यालय
बिलासपुर - 495009 (छ.ग.)
Bilaspur 495009 (C.G.)

Place: Bilaspur, C.G.

ACKNOWLEDGEMENT

I would like to express my profound gratitude and grateful regards to my supervisor, **Prof. Charu Arora**, Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), who has given their benevolent co-operation at every stage of project work and without their guidance this work would hardly have been completed.

I am grateful to **Prof. Khemchand Dewangan**, Head, Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), who has been helping and facilitating during my project work.

I express my thanks to **Prof. H.S.Tewari**, Dean, School of Physical Sciences, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), for his co-operation and encouragement.

I extend my earnest thanks to **Prof. S. K. Singh, Prof. A. K. Singh, Dr. B. Sharma, Dr. A. Shrivastava, Dr. S. S. Thakur, Dr. U. P. Azad, Dr. S. B. Singh, Mr. Santosh Kumar, Mr. Aazad Verma, Mr. Raju, Mrs Aparna**, Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) for helping me in conducting laboratory work as well as in data completion.

I am also thankful to my classmates and my relatives who always encouraged and inspired me.

Words can never convey my deep gratitude and grateful regards to my parents and family for their affection, faith and patience during the whole of the project.

Date:

Tejas Yadav

Table of Contents

1. Introduction	7
2. Aims and Objectives	9
Aim	
Objectives	
3. Materials and Methods	10
Preparation of Adsorbent	
Adsorption Experimental Design	
4. Results and Discussion	11
Characterization of Adsorbent (FTIR Analysis)	
Effect of Initial Dye Concentration	
Effect of Adsorbent Dose	
Effect of Temperature	
Effect of pH	
5. Conclusion	16
6. References	17

INTRODUCTION

Scientists and researchers around the world are increasingly concerned about a pressing global problem: the escalating pollution of water ⁽¹⁾. The swift pace of urbanization and industrial growth has led to the contamination of natural water sources, causing significant harm to the environment, society, and the economy ⁽²⁾. The primary causes of water pollution are a range of human activities, such as industrial waste discharge into water bodies, inadequate water supply, wastewater treatment facilities, and agricultural practices ⁽³⁾. One of the main contributors to water pollution is the textile sector, which uses a variety of colours in its production operations ⁽⁴⁾. The dye molecules present in wastewater pose significant long-term environmental threats because they are not biodegradable and persist in the ecosystem for extended periods ⁽⁵⁾.

Therefore, before wastewater is released into the environment, colour molecules must be removed. These dye molecules can seriously endanger aquatic life as well as human health if they are left untreated in the water ⁽⁶⁾. Aquatic species have been linked to serious health problems because of exposure to contaminated water, and humans have experienced skin irritations and even cancer-like illnesses ⁽⁷⁾.

Why Removing Dye Molecules from Water Sources Is Essential

Eliminating dyes from wastewater is essential because, if not addressed, they can harm the environment ^{(8),(9)}. Dye molecules are resistant to biodegradation, which means they remain in nature for extended periods, causing physical, chemical, and biological changes to water bodies. Aquatic life has been shown to have serious health issues, such as behavioural, developmental, and reproductive alterations, when exposed directly to contaminated water. Additionally, dye molecules decrease oxygen transfer and light penetration in water, which might change the physicochemical characteristics of aquatic habitats ⁽¹⁰⁾. If wastewater discharged into the environment contains untreated colour, it may have long-term negative effects on human health. People may be exposed to contaminated water when it is discharged into natural water sources, which can lead to skin irritation and other health problems. Furthermore, using contaminated water might result in more severe health problems including cancer or liver and kidney damage.

The paper, leather, textile, and biological staining industries have long made substantial use of the synthetic dye malachite green ⁽¹¹⁾. However, the use of this dye has been

The wrong use of chemistry

A Project Report Submitted to (a review work)

Guru Ghasidas Vishwavidyalaya bilaspur C.G



**Bachelor's of Science in
Chemistry**

Submitted by

YourName: Manshi Singh.

B.Sc.6thsem

Enrollment No.

GGV/22/07031

RollNo. 22103131

no. mo. 8827661703

mail. id singhmansi0629@gmail.com

Supervisor

Prof. Khemchand Dewangan

Assistant Professor

Department of Chemistry

Guru Ghasidas Vishwavidyalaya

Dr.Khemchand Dewangan
Assistant Professor



Department of Chemistry
GuruGhasidasVishwavidyalaya
Bilaspur-495009,C.G.

CERTIFICATE

This is to certify that *miss.Manshi singh* has completed the project dissertation entitled *The wrong use of chemistry* under my supervision for the partial fulfillment of required degree of "*Bachelor of Science in Chemistry*". She has worked diligently, methodically and also collected the literature review sincerely. During this project work she has learnt about various aspects of chemical science to the entitled topic.

To the best of my knowledge and belief of the project

- Is original and has not been submitted anywhere forward of any degree.
- Fulfills the requirement of the Ordinance relating to the BSc. Degree of the university.

I wish her every success in the future life.

Date: 09-05-2025
Place: Bilaspur, C.G.


Signature of the Supervisor

A
Project Report
On
**EVALUATION OF PARTHENIUM ASH AS AN
ADSORBENT FOR FUCHSIN BASIC REMOVAL
FROM WASTEWATER**

Submitted by
Mithlesh Kumar Chandra

In partial fulfillment of the requirements for the degree in
B.Sc. 6th Sem. (Chemistry)

Under the guidance of
Dr. Charu Arora



**DEPARTMENT OF CHEMISTRY
GURU GHASIDAS VISHWAVIDYALAYA BILASPUR (C.G.)**

May 2025

JK
91525

गुरु घासीदास विश्वविद्यालय, बिलासपुर
Guru Ghasidas Vishwavidyalaya, Bilaspur



*Attaining the pinnacle of excellence
Our Institute proudly carries the highest grade in NAAC accreditation!*

CERTIFICATE

This is to certify that the project report entitled,
“Evaluation of Parthenium Ash as an Adsorbent for Fuchsin
basic Removal from Wastewater”, submitted by Mithlesh
Kumar Chandra in partial fulfillments for the
requirements for an award of B.sc (chemistry) in Guru
Ghasidas Vishwavidyalaya is prepared by him under
my supervision and guidance and this work is not been
submitted elsewhere for a degree.

*Charu Arora
9.5.25*

Dr. Charu Arora

(Professor)


Department of chemistry

*KPI
09.05.2025*
Signature of the HOD

अध्यक्ष / Head
रासायनिक विभाग
Dept. of Chemistry
गुरु घासीदास विश्वविद्यालय,
Guru Ghasidas Vishwavidyalaya,
बिलासपुर 498009 (B.P.)
बिलासपुर 495009 (C.G.)

ACKNOWLEDGEMENTS

I consider it as my privilege to express gratitude and respect to all those who guided and inspired me in the completion of my B.sc project. The undertaking of this project inculcated a strong sense of research inside me and I also came to know about so many new things. First of all, I would like to acknowledge and extend my heartfelt gratitude to Dr. Charu Arora Professor at Department of chemistry , Guru Ghasidas Vishwavidyalaya Bilaspur for his exemplary guidance and constructive criticism, during the undertaking of this project entitled, " removal of basic dye from aqueous solution by adsorption using plant ash" I am also thankful to all the faculties and supporting staff of Department of chemistry , Guru Ghasidas Vishwavidyalaya Bilaspur for their constant help and extending the departmental facilities for my project.


Signature of candidate

ABSTRACT

Water pollution due to synthetic dyes, especially from textile and paper industries, has become a serious environmental issue. Basic dyes like methylene blue are widely used because of their bright color and solubility in water. However, they are toxic, non-biodegradable, and pose a threat to aquatic life and human health. Effective removal of these dyes from wastewater is essential. Among various methods, **adsorption** is considered one of the most efficient and economical techniques. This study investigates the use of **plant ash** as a low-cost, eco-friendly adsorbent for removing basic dye from water. Plant ash is obtained by burning plant biomass and is rich in minerals such as calcium, magnesium, potassium, and silica. These components give plant ash a high surface area and alkaline nature, making it suitable for adsorbing cationic dyes. The experiment was conducted using methylene blue dye solution. Plant ash was added in different amounts to the solution and stirred for varying time intervals. The remaining dye concentration was measured using a UV-Visible spectrophotometer. The effects of different parameters like **pH, contact time, adsorbent dosage, and initial dye concentration** were studied. Results showed that dye removal efficiency increased with higher adsorbent dose and longer contact time. The maximum removal occurred in the pH range of 8–9 due to favorable electrostatic interactions between the dye and the negatively charged ash surface. This research concludes that **plant ash is an effective, inexpensive, and sustainable material** for removing basic dyes from aqueous solutions. It presents a practical solution for treating dye-contaminated water, particularly in low-resource settings, and supports environmentally friendly practices in wastewater management.

CONTENTS

Certificate

Acknowledgement

Abstract

Contents

List of table and figures

- Introduction
- Literature review
- Aim and objectives
 - Aim
 - Objectives
- Material and methods
 - Preparation of adsorbent
 - Adsorption experimental design
 - Adsorption isotherms study
 - Kinetics study
 - Thermodynamics study
- Result and discussion
 - Adsorption experimentals
 - Effect of initial dye concentration
 - Effect of adsorbent dose
 - Effect of temperature
 - Effect of pH
- Study of adsorption isotherm
- Study of adsorption kinetic
- Thermodynamic study
- Conclusion
- Reference

Extraction and identification of DNA from Banana

BSc. Project Report

BY

NAGESHWARI SAHU

Roll No.- 22103134

Enrollment No.-GGV/22/07034



Department of Chemistry

GURU GHASHIDAS VISHAWAVIDYALAYA

KONI, BILASPUR, (C.G.)

Mobile No. - 9301555261

E-Mail - rajimpurni21@gmail.com


- 9/5/25

Certificate

It is to certify that the work in the project report titled "**Extraction and identification of DNA from Banana**" by Nageshwari Sahu has been approved under my supervision that this work has not been submitted elsewhere.

GGV, Bilaspur

09/05/2025



Prof. Khemchand Dewangan

Project Supervisor

Department of Chemistry

Guru Ghasidas Vishawavidyalaya

Koni, Bilaspur, (C.G.)



Prof. Khemchand Dewangan

Head of Department

Department of Chemistry

Guru Ghasidas Vishawavidyalaya

Koni, Bilaspur, (C.G.)

Table of Contents

Cover Page	i
Statement	ii
Certificate	iii
Acknowledgements	iv
Table of Contents	v

Abstract

Chapter 1. Introduction for DNA

1.1 Structure of DNA

Chapter 2. Extraction and identification of DNA from Banana

2.1. Material required

2.2 Equipment and special glassware

2.3 Principles

2.4. DNA, the molecule of life

2.5. DNA extraction from Banana

2.5.1 Homogenization

2.5.2 Deproteinization

2.5.3 Precipitation

2.6. Procedure

Chapter 3. Identification of DNA

3.1 UV-Visible spectroscopy

3.2 Graph

Chapter 4. Conclusion and References

4.1 Conclusion

4.2 References

Lab work on Hydrogel and Its application

A Project Report Submitted

to

Guru Ghasidas Vishwavidyalaya, Bilaspur



In partial fulfillment to the requirement for the degree of

Bachelor of Science
in
Chemistry

Submitted by

NIDHI SHUKLA

Supervisor

Dr. BHASKAR SHARMA

Department of Chemistry

Guru Ghasidas Vishwavidyalaya, Bilaspur-495009(C.G.)

(2025)



रसायन विज्ञान

Department of Chemistry

गुरु घासीदास विश्वविद्यालय, बिलासपुर-495009, छत्तीसगढ़
Guru Ghasidas Vishwavidyalaya, Bilaspur-495009, Chhattisgarh

(A Central University established by the Central University Act 2009 No. 29 of 2009)

<http://www.ncu.ggu.ac.in/>



**Prof. Khemchand
Dewangan**
Professor and Head
M.Sc., Ph.D.

Department of Chemistry
Guru Ghasidas University

Contact: 9691012090, 9935269379

E-mail ID:

dewanganke@gmail.com


Ref. No.

Bilaspur, Date: 9/5/2025

FORWARDING CERTIFICATE

This is to certify that NIDHI SHUKLA has completed the project work entitled "LAB WORK ON HYDROGEL AND ITS APPLICATION" under the supervision of Dr. Bhaskar Sharma, for the partial fulfillment of required degree of "Bachelor of Science" and forwarded to the Examiner for evaluation.

I wish her every success in the future life.


Signature of the Head

अध्यक्ष / Head
रसायन शास्त्र विभाग
Deptt. of Chemistry
गुरु घासीदास विश्वविद्यालय,
जिला: गणेशदास विश्वविद्यालय,
बिलासपुर-495009 (छ.ग.)
बिलासपुर-495009 (C.G.)

CONTENTS-

1.Introduction	1-2
2.Types Of Gels	2-3
3.Gel Versus Hydrogel	3
4. What Is Hydrogel?	3-4
5.Classification Of Hydrogel	4
6.Preparation Methods	5-9
7.Smart Hydrogels	9-10
8. Properties Of Hydrogels	10-16
9.General Benefits	16
10. Applications Of Hydrogels	17-21
11.Conclusion	21-22
12.Reference	22-25

**Adsorptive Removal of Aniline Blue using Pomegranate Leaf
Ash**

**A Project Report Submitted to
Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.**



This dissertation is submitted in partial fulfilment of the
requirements for the degree of

**Bachelors of
Science in
Chemistry**

Submitted by
Borangi Tushara
B.Sc. 6th Sem
Enrollment No. GG/22/07012
Roll No. 22103112

Submitted to
Dr. Charu Arora (Professor)
Department of Chemistry
Guru Ghasidas Vishwavidyalaya

Ch
9/5/25

Guru Ghasidas Vishwavidyalaya

(A Central University established under Central Universities Act 2009)

Borangi Tushara
B.Sc. 6th Sem
Roll No. 22103112



Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur -495009, C.G.

DECLARATION

I, *Borangi Tushara*, hereby declare that the project dissertation entitled "*Adsorptive Removal of Aniline Blue using Pomegranate Leaf Ash*" is submitted as partial fulfilment of B. Sc. in Chemistry. The project work has been performed in the Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur under the supervision of *Prof. Charu Arora*.

I hereby declare that, to the best of my knowledge, this project is an original work and does not contain any material that has been previously submitted for the award of any degree at this University or any other educational institution, without proper citation and acknowledgement. I further affirm that this project is my own original work and will remain the intellectual property of the Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.).


Signature of the Candidate

Date: 9/5/25

Place: Bilaspur, C.G.

Guru Ghasidas Vishwavidyalaya

Prof. Charu Arora
Professor
Department of
Chemistry



Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur-495009, C.G.

(A Central University established under Central Universities Act 2009)

CERTIFICATE

This is to certify that *Ms. Borangi Tushara* has completed the project dissertation entitled "*Adsorptive Removal of Aniline Blue using Pomegranate Leaf Ash*" under my supervision for the partial fulfilment of required degree of "*Bachelors of Science in Chemistry*". Throughout this project, she has demonstrated diligence, a methodical approach, and a sincere commitment to collecting and reviewing relevant literature. In the process, she has gained a comprehensive understanding of various aspects of chemical science related to the topic at hand.

To the best of my knowledge and belief of the project

- 1) is original and has not been submitted anywhere for award of any degree.
- 2) Fulfils the requirement of the Ordinance relating to the B.Sc. degree of the university.

I wish her every success in the future life.

Date: 9/5/25

Place: Bilaspur, (C.G)

Charu Arora

Signature of the Supervisor

(A Central University established under Central Universities Act 2009)

Prof. K. Dewangan
Head of the
Department



Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur -495009 C.G.

FORWARDING CERTIFICATE

This is to certify that *Ms. Borangi Tushara* has completed the project work entitled as "*Adsorptive Removal of Aniline Blue using Pomegranate Leaf Ash*" under the supervision of *Prof Charu Arora*, for the partial fulfilment of required degree of "*Bachelors of Science in Chemistry*".


To the best of my knowledge and belief of the project

- 1) is original and has not been submitted anywhere for award of any degree.
- 2) Fulfils the requirement of the Ordinance relating to the B.Sc. degree of the university.

I recommend the project report be forwarded to the respective examiners for evaluation.

Date: 9/5/25

Place: Bilaspur, C.G.


Signature of the H.O.D

ACKNOWLEDGEMENT

I would like to express my profound gratitude and grateful regards to my supervisor, **Prof. Charu Arora**, Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), who has given their benevolent co-operation at every stage of project work and without their guidance this work would hardly have been completed.

I am grateful to **Prof. K. Dewangan**, Head, Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), who has been helping and facilitating during my project work.

I extend my earnest thanks to **Dr. S. K. Singh, Dr. A. K. Singh, Dr. B. Sharma, Dr. A. Shrivastava, Dr. S. S. Thakur, Dr. U. P. Azad, Dr. S. B. Singh, Mr. Santosh Kumar, Mr. Aazad Verma, Mr. Raju, Mis Aparna , Mis Nidhi Rai** Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) for helping me in conducting laboratory work as well as in data completion.

I am also thankful to my classmates and my relatives who always encouraged and inspired me.

Words can never convey my deep gratitude and grateful regards to my parents and family for their affection, faith and patience during the whole of the project.

Date 9/5/25

Borangi Tushara

TABLE CONTENTS

Entry	Content	Page No.
1.	Introduction	07
2.	Literature Review	08
3.	Aims and Objectives	09
4.	Materials and Methods	09
5.	Result and Discussion	12
6.	Conclusion	17
7.	Reference	18

**Evaluation of Parthenium Ash as an Adsorbent for Aniline
Blue Dye Removal from Wastewater**

**A Project Report Submitted to
Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.**



This dissertation is submitted in partial fulfilment of
the requirements for the degree of

**Bachelor of
Science in
Chemistry
May 2025**

Submitted by

RAJESH CHANDRA

B.Sc. 6th Sem

Enrolment No. GGV/22/07043

Roll No. 22103143

Supervisor

Dr. Charu Arora (Professor)

Department of Chemistry

Guru Ghasidas Vishwavidyalaya

गुरु घासीदास विश्वविद्यालय, बिलासपुर
Guru Ghasidas Vishwavidyalaya, Bilaspur



*Attaining the pinnacle of excellence,
Our Institute proudly secures the highest grade in NAAC accreditation.*

Prof. Charu Arora

Department of Chemistry

[A Central University established under Central Universities Act 2009]

CERTIFICATE

This is to certify that **RAJESH CHANDRA** has completed the project dissertation entitled "**Evaluation of Parthenium Ash as an Adsorbent for Aniline Blue Dye Removal from Wastewater**" under my supervision for the partial fulfilment of required degree of "**Bachelor of Science in Chemistry**". Throughout this project, he has demonstrated diligence, a methodical approach, and a sincere commitment to collecting and reviewing relevant literature. In the process, he has gained a comprehensive understanding of various aspects of chemical science related to the topic at hand.

To the best of my knowledge and belief of the project

- 1) is original and has not been submitted anywhere for award of any degree.
- 2) Fulfils the requirement of the Ordinance relating to the M.Sc. degree of the university.

I wish him every success in the future life.

Date: 9.5.25

Place: Bilaspur,(C.G)

3

Charu Arora
Signature of the Supervisor

(A Central University established under Central Universities Act 2009)

Prof. KC DEWANGAN
Head of the Department



Department of Chemistry Guru
Ghasidas Vishwavidyalaya
Bilaspur - 495009, C.G.

FORWARDING CERTIFICATE

This is to certify that *RAJESH CHANDRA* has completed the project work entitled as "*Evaluation of Parthenium Ash as an Adsorbent for Aniline Blue Dye Removal from Wastewater*" under the supervision of *Prof Charu Arora*, for the partial fulfilment of required degree of "*Master of Science in Chemistry*".

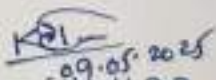
To the best of my knowledge and belief of the project

- 1) is original and has not been submitted anywhere for award of any degree.
- 2) Fulfils the requirement of the Ordinance relating to the M.Sc. degree of the university.

I recommend the project report be forwarded to the respective examiners for evaluation.

Date:

Place: Bilaspur, C.G.


Signature of the H.O.D

अध्यक्ष / Head
रासायन शास्त्र विभाग
Deptt. of Chemistry
गुरु घासीदास विश्वविद्यालय,
Suru Ghasidas Vishwavidyalaya

Bilaspur 495009 (C.G.)

TABLE CONTENTS

Entry	Content	Page No.
1.	Introduction	07
2.	Materials and Methods	09
3.	Preparation of Adsorbent	10
4.	Adsorption Experiment Design	11
5.	Result and Discussion	12
6.	Conclusion	16
7.	Reference	18

COMPUTATIONAL CHEMISTRY FOR BLIND AND VISUALLY IMPAIRED STUDENTS

A Project Report Submitted to

Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.



In partial fulfillment of the requirement for the degree of

**Bachelors of Science
In
Chemistry**

**Submitted by
Samiksha Yadav**

B.Sc. 6th Sem

Enrollment No. - GGV/22/07050

Roll No.- 22103150

Supervisor

Prof. Khemchand Dewangan

Head of Department

Department of Chemistry

Guru Ghasidas Vishwavidyalaya


9/5/25

CERTIFICATE

This is to certify that the report entitled "Computational Chemistry for Blind People" submitted by **Samiksha yadav**, bearing enrollment number **22103150**, is the result of original work carried out under my supervision and guidance. This project was carried out in partial fulfilment of the requirements for the Bachelors of chemistry at Guru Ghasidas University.

To the best of my knowledge, the work presented herein has not been submitted to any other institution or university for the award of any degree or diploma.


09.05.2025

Supervisor's Name: Prof. Khemchand Dewangan(HOD)

Designation: Project Supervisor

Department: Department of Chemistry

Institution: Guru Ghasidas University, Bilaspur

Date: _____

Signature: _____

TABLE OF CONTENT

1. **Abstract**
2. **Introduction**
3. **Overview of Computational Chemistry Techniques**
4. **Challenges Faced by Blind People in Computational Chemistry**
5. **Accessibility Solutions and Assistive Technologies**
 - Tactile Molecular Models and Haptic Devices
 - Sonification of Chemical Data
 - Accessible Command-Line Interfaces and Scripting
 - Screen Reader-Compatible Software
 - Community Resources and Inclusive Initiatives
6. **Workflow for Conducting Applied Computational Chemistry for BVI Students**
 - Structural Data Integration
 - Producing Input Files for Computational Chemistry
 - Processing Computational Output Files
 - Data Interpretation through Accessible Technologies
7. **Limitations, Challenges, and Future Recommendations**
8. **Recommendations and Future Work**
9. **Conclusion**
10. **Reference**



DEPARTMENT OF CHEMISTRY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.) INDIA
(A central University Established by the Central University Act 2009 No. 25 of 2009)

A

Project Report

On

**Enzymes catalyse polyester synthesis: A comparison
with chemical catalyst.**

Submitted For
Partial fulfillment of the requirement for the degree of
Bachelor of Science (Hon's) in
Chemistry

Under the Guidance :
Prof Khemchand Devangan (HOD)
Dr. Bhaskar Sharma (Asst. prof)
B.Sc. (Chemistry) VI Sem.
Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur (C.G.), 495009, INDIA

Submitted by:
Saumya Mishra
Roll no. – 22103152

Session – 2022-25



DEPARTMENT OF CHEMISTRY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.) INDIA
(A central University Established by the Central Universities Act 2009 No. 25 of 2009)

APPROVAL CERTIFICATE

This is the certify that the project entitled, " Enzymes catalyse polyester synthesis: A comparison with chemical catalyst " submitted by Saumya Mishra is approved for the award of Bachelor of Science (Hon's) in Chemistry.

Date:09/05/2025

Prof Khemchand Devangan
Head of Department
Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur(C.G)

अध्यक्ष/Head
रासायनिक विभाग
Deptt. of Chemistry
गुरु गणेशदास विश्वविद्यालय,
गुरु गणेशदास विश्वविद्यालय,
बिलासपुर 495009 (छ.ग.)
Bilaspur 495009 (C.G.)

TABLE OF CONTENT

S.NO	HEADING	PAGE NO.
1	Introduction	01-05
2	Literature Review	06-14
3	Methodology	15-20
4	Expected Outcomes	20-21
5	Significance and scope	21-23
6	Timeline	23-24
7	Conclusion	25
8	References	26-27

"Design and Quantum Chemical Evaluation of Molecular Systems Using Avogadro Modeling and ORCA Simulations"

A Project Report Submitted to

GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR, C.G.



In partial fulfillment of the requirement for the degree of

Bachelors of Science

In

Chemistry

Submitted by

Shruti Goswami

B.Sc. 6th Sem

Enrollment No.- GGV/22/07057

Roll No.- 22103157

Supervisor

Prof. Khemchand Dewangan

Head of Department

Department of Chemistry


Guru Ghasidas Vishwavidyalaya


9/5/25

CERTIFICATE

It is to certify that the work in the project report titled "**Design and Quantum Chemical Evaluation of Molecular Systems Using Avogadro Modeling and ORCA Simulations**" by Shruti Goswami has been approved under my supervision that this work has not been submitted elsewhere.

GGV BILASPUR
09/05/2025


Prof. Khemchand Dewangan
Project Supervisor
Department of Chemistry
Guru Ghasidas Vishwavidyalaya,
Bilaspur (C.G.)



Prof. Khemchand Dewangan
Head of Department
Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur, 495001 (C.G.)

TABLE OF CONTENTS

Cover Page	1
Statement	2
Certificate	3
Acknowledgements	4
Table of Contents	5
Abstract	6
Chapter 1. Introduction	7
1.1 Computational Chemistry	7
1.1.1 Methods	
1.2 Molecular Mechanics	8
1.2.1 Force Fields	
1.2.2 Workflow of a Molecular Mechanics Calculations	
1.2.3 Parameterization in Force Fields	
1.2.4 Applications of MM calculations	
1.2.5 Strength and Limitations	
1.2.6 Common MM software packages	
1.3 Quantum Mechanics	11
1.3.1 Background Concepts	
1.3.2 Classical Quantum Computational Chemistry	
1.3.3 Quantum Computational Chemistry on Quantum Computers	
Chapter 2. Computational Details and Experiment	14
2.1 Materials and Applications	
2.2 Method of Computational Chemistry	

Chapter-3 Results and Discussion	17
3.1 Theoretical Investigation of the Calculated Energies of Different Molecules in Avogadro and ORCA	17
3.2 Visualization of molecules in avogadro with its optimized geometry	18
Chapter-4 Conclusion and References	20
4.1 Conclusion	20
4.2 References	21

A PROJECT REPORT ON
MICROWAVE ASSISTED SYNTHESIS: A GREEN CHEMISTRY
APPROACH

DEPARTMENT OF CHEMISTRY
GURU GHASIDAS VISHWAVIDYALAYA
(A CENTRAL UNIVERSITY)



SUPERVISOR:

DR. BHASKAR SHARMA
ASSISTANT PROFESSOR
GURU GHASIDAS VISHWAVIDYALAYA
KONI, BILASPUR (C.G.)

SUBMITTED BY:

SURBHI SHUKLA
B.Sc (HONOURS)
6TH SEMESTER
ROLL NO- 22103160

Sh.
9/5/25

DEPARTMENT OF CHEMISTRY
GURU GHASIDAS VISHWAVIDYALAYA



KONI, BILASPUR (C.G.)

FORWARDING CERTIFICATE

This is to certify that **SURBHI SHUKLA** has completed the project under the supervision of **DR. BHASKAR SHARMA**, for the partial fulfillment of required degree of "Bachelors of Science in Chemistry".

To the best of my knowledge and belief of the project is original and has not been submitted anywhere for award of any degree, and it fulfills the requirements of the ordinance relating to that B.Sc. degree of the university.

I wish her every success in the future life.


9.05.2025
Head of Department

Prof. Khemchand Dewangan

अध्यक्ष / Head
रसायन शास्त्र विभाग
Dept. of Chemistry
गुरु ग्हासिदास विश्वविद्यालय,
बिलासपुर (च.ग.)
बिलासपुर - 491002 (छ.ग.)
दूरभाष - 205079 (C.G.)

CONTENTS

S.N.	Topic	Page No.
1	ABSTRACT	1
2	INTRODUCTION	2-3
3	MECHANISM OF MICROWAVE HEATING	4-5
4	MICROWAVE SYNTHESIS VERSUS CONVENTIONAL SYNTHESIS	5-7
5	BENEFITS OF MICROWAVE ASSISTED SYNTHESIS	7-8
6	LIMITATIONS OF MICROWAVE ASSISTED SYNTHESIS	9
7	ENHANCED MICROWAVE SYNTHESIS	9-10
8	APPLICATIONS OF MICROWAVE ASSISTED SYNTHESIS	10-14
9	CONCLUSION	15
10	REFERENCES	16-21

B.sc. Project Dissertation Report

**METAL THIOLATE COMPLEXES ,
STRUCTURE AND APPLICATION IN
BIOLOGICAL SYSTEMS**



By

Chitranshi Mandavi

Roll no : 22103114

Supervisor : Dr. Suryabhan Singh

Department of Chemistry


Guru Ghasidas Vishwavidyalaya

Bilaspur - 495009 (C.G)

FORWARDING CERTIFICATE

This is to certify that Chitranshi Mandavi has completed the project work entitled "Metal Thiolate Structure and Application in Biological System" under the supervision of Dr, Suryabhan Singh, for the partial fulfilment of required degree of Bachelor of Science and forwarder the Examiner for evaluation.

I wish her every success in the future life


Signature of Head 07.2025

Date :

Place: Bilaspur

अध्यक्ष / Head
रसायन शास्त्र विभाग
Deptt. of Chemistry
मुख्य कार्यालय विश्वविद्यालय,
Suryabhan Singh Vishwavidyalaya,
बिलासपुर 495009 (छ.ग.)
Bilaspur 495009 (C.G.)

Content

1: Introduction

2: Structural Features of Metal Thiolate Complexes

2.1 Mononuclear Complexes

2.2 Polynuclear Complexes and Clusters

2.3 Influence of Bridging and Terminal Thiolate Ligands

3: Biological Features of Metal Thiolate Complexes

3.1 Introduction to the Biological Relevance of Metal-Sulfur Interactions

3.2 Metal Thiolates in Biological Systems

3.3 Applications in Drug Discovery and Therapeutics Toxicity and Biological Fate of Metal Thiolate Compounds

4 :Conclusions and Future perspective of Metal Thiolate

References

**A PROJECT REPORT ON
USE OF METAL COMPLEXES IN MRI**

**DEPARTMENT OF CHEMISTRY
GURU GHASIDAS VISHWAVIDYALAYA
(A CENTRAL UNIVERSITY)**

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE DEGREE OF B.Sc. CHEMISTRY



SUPERVISOR:

Dr. Suryabhan Singh

Assistant professor

Guru Ghasidas Vishwavidyalaya

Koni, Bilaspur (C.G.)

SUBMITTED BY:

Sneha Singh Rajput

B.sc (Hons) 6th Sem Chemistry

Roll No: 22103158

Sneha Singh Rajput
915185

**GURU GHASIDAS VISHWAVIDYALAYA
KONI BILASPUR (C.G)**




FORWARDING CERTIFICATE

This is to certify that **SNEHA SINGH RAJPUT** under the supervision of **Dr. SURYABHAN SINGH**, For the Partial Fulfilment of required degree of "Bachelors in Science of Chemistry".

To the best of my knowledge and belief of the project .

1. is original and has not been submitted anywhere for award of any degree.
2. fulfils the requirements of the ordinance relating to that B.sc degree of the university.

I wish her every success in the future.


69.05.2025
Head of Department

Prof. Khemchand Dewangan

अधीन / Head
रासायन शास्त्र विभाग
Dept. of Chemistry
गुरु गसिदा विश्वविद्यालय,
गुरु गसिदा विश्वविद्यालय,
बिलासपुर 495009 (B.S.)
फोन नं. 495009 (C.G.)

CONTENTS

- 1. ABSTRACT**
- 2. INTRODUCTION**
- 3. USE OF METAL COMPLEXES IN MRI**
- 4. USE OF MRI IN MEDICAL FIELD**
- 5. ADVANTAGE AND DISADVANTAGE OF MRI**
- 6. CONCLUSION**
- 7. REFERENCE**

A PROJECT REPORT ON
**CARBENE COMPLEXES OF IRIDIUM AND
THEIR CATALYTIC PROPERTY**

DEPARTMENT OF CHEMISTRY
GURU GHASIDAS VISHWAVIDYALAYA
(A CENTRAL UNIVERSITY)

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR
THE DEGREE OF B.Sc. CHEMISTRY



SUPERVISOR:

Dr. Suryabhan Singh

Assistant professor of Department

Guru Ghasidas Vishwavidyalaya

Koni, Bilaspur (C.G.)

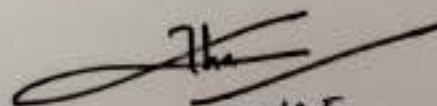
SUBMITTED BY:

Sakshi Tanwar

B.Sc. (Honours) Chemistry

6th semester

Roll No.- 22103148


9/5/25

DEPARTMENT OF CHEMISTRY
GURU GHASIDAS VISHWAVIDYALAYA
KONI, BILASPUR (C.G.)




FORWARDING CERTIFICATE

This is to certify that **SAKSHI TANWAR** under the supervision of **Dr. SURYABHAN SINGH** has completed the project for the partial fulfillment of required degree of "Bachelors of Science in Chemistry".
To the best of my knowledge and belief of the project

1. is original and has not been submitted anywhere for award of any degree.
2. fulfils the requirements of the ordinance relating to the B.Sc. degree of the university.

I wish her every success in the future life.


09.05.2025

Head of Chemistry

अध्यापक / Head
विभाग सरिता विभाग
Dept. of Chemistry
गुरु गहासिदा विश्वविद्यालय,
Guru Ghasidas Vishwavidyalaya,
बिलासपुर 495009 (छ.ग.)
Bilaspur 495009 (C.G.)

CONTENTS

1. ABSTRACT
2. INTRODUCTION
3. TYPES AND METHODS OF SYNTHESIS
4. CATALYTIC PROPERTIES
5. CONCLUSION
6. REFERENCES

Metal Organic Framework as Catalysis

A Project submitted to

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)



In partial fulfillment

For the award of the degree

Of

**Bachelor of
Science in**

Chemistry

by

Garima Yadav

Under the Guidance of

Dr. Suryabhan Singh

Research center

Department of Chemistry,

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G)

May 2025



**Forwarded to Guru Ghasidas Vishwavidyalaya Bilaspur (CG) India
CERTIFICATE BY THE HEAD OF THE DEPARTMENT**

The M.sc project entitled "**Metal Organic Framework as Catalysis**" Submitted by *Garima Yadav* (Roll No. 22103147, Enrollment No.: GGV/22/07047) has been examined by the undersigned as a part of the examination and is hereby recommended for the award of the degree of Bachelor of Science in the Department of Chemistry of Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.).

KEM
09.05.2025

Signature of the HOD

Dr. Khemchand Dewangan,
Professor

Department of Chemistry, G.G.V.
Bilaspur (C.G)

अध्यक्ष / Head
रासायन शास्त्र विभाग
Dept. of Chemistry
गुरु गणेशदास विश्वविद्यालय,
Guru Ghasidas Vishwavidyalaya
द्वितीय मंजरी 495009 (छ.प्र.)
Bilaspur (C.G.)