

Green Synthesis of ZnO Nanoparticles: Assessing Antibacterial Efficacy

Project report submitted to the University of Calicut for partial fulfilment of the
award of the degree of

B. Sc. Program in Chemistry

By

Anjana K S

CRAVSCH002

UNDER THE SUPERVISION OF

Dr. Vidya Francis

Assistant Professor

Department of Chemistry

Carmel College (Autonomous), Mala



DEPARTMENT OF CHEMISTRY

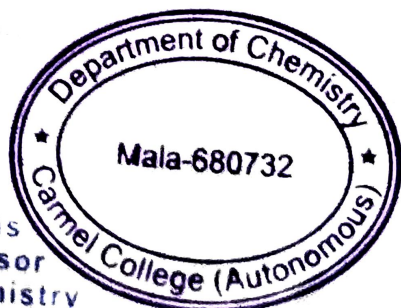
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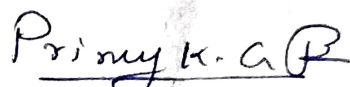
THRISSUR, KERALA

2023-2024


Supervisor

Dr. Vidya Francis
Assistant Professor
Department of Chemistry
Carmel College (Autonomous)




Head of the Department

Head
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Mala-680732



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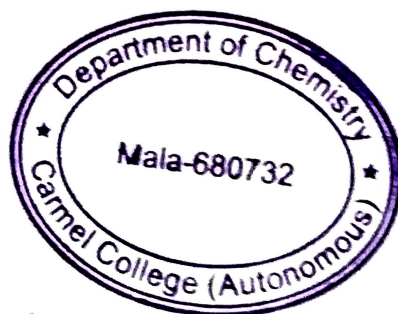
CERTIFICATE

This is to certify that the report on the project entitled "Green Synthesis of ZnO Nanoparticles: Assessing Antibacterial Efficacy" is a bonafide record of the work carried out by ANJANA K S (Reg No: CRAVSCH002) under my supervision and guidance towards the partial fulfilment of requirement for the award of the degree of Bachelor of Science in Chemistry at Carmel College (Autonomous), Mala in the academic year 2023-2024.

Poimay K. A. B.

Head of the Department

Head
Department of Chemistry
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[Signature]
Faculty in charge

Dr. Vidya Francis
Assistant Professor

Submitted for project Evaluation held on

Examiners:

- 1) *Anjaly Jacob K.*
DR. ANJALY JACOB K.
- 2) *Rashmi A.T.*
DR. RASHMI A.T.

Green Synthesis of ZnO Nanoparticles: Assessing Antibacterial Efficacy

Project report submitted to the University of Calicut for partial fulfilment of the
award of the degree of

B. Sc. Program in Chemistry

By

Anju Prakash P

CRAVSCH003

UNDER THE SUPERVISION OF

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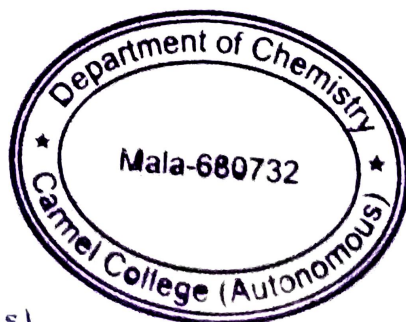


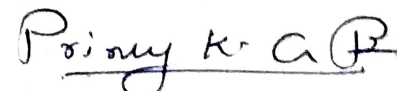
**DEPARTMENT OF CHEMISTRY
CARMEL COLLEGE (AUTONOMOUS), MALA
THRISSUR, KERALA**

2023-2024


Supervisor

Dr. Vidya Francis
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Head of the Department

Head
Department of Chemistry
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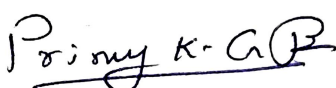


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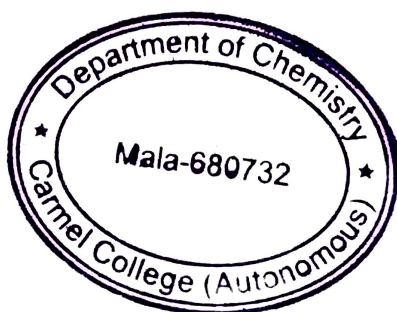
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Mala-680732


CERTIFICATE

This is to certify that the report on the project entitled "Green Synthesis of ZnO Nanoparticles: Assessing Antibacterial Efficacy" is a bonafide record of the work carried out by ANJU PRAKASH P (Reg No: CRAVSCH003) under my supervision and guidance towards the partial fulfilment of requirement for the award of the degree of Bachelor of Science in Chemistry at Carmel College (Autonomous), Mala in the academic year 2023-2024.


Head of the Department

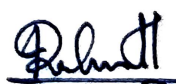
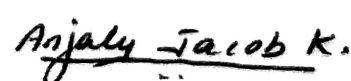
Head
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Faculty in charge
Dr. Vidya Francis
Assistant Professor

Submitted for project Evaluation held on

Examiners:

- 1) 
Dr. Roshini. G. T.
- 2) 
Dr. ANJALY JACOB K.

Green Synthesis of ZnO Nanoparticles: Assessing Antibacterial Efficacy

Project report submitted to the University of Calicut for partial fulfilment of the
award of the degree of

B. Sc. Program in Chemistry

By

Aradhya S

CRAVSCH004

UNDER THE SUPERVISION OF

Dr. Vidya Francis

Assistant Professor

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Carmel College (Autonomous), Mala

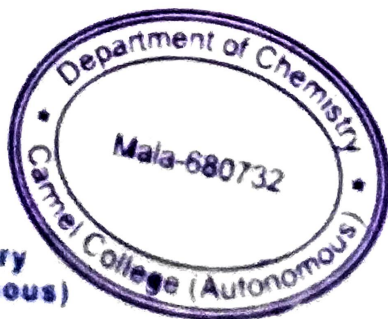


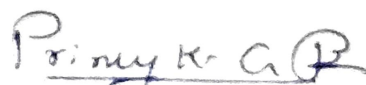
**DEPARTMENT OF CHEMISTRY
CARMEL COLLEGE (AUTONOMOUS), MALA
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2023-2024


Supervisor

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Assistant Professor
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Head of the Department

Head
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CARMEL COLLEGE (AUTONOMOUS), MALA

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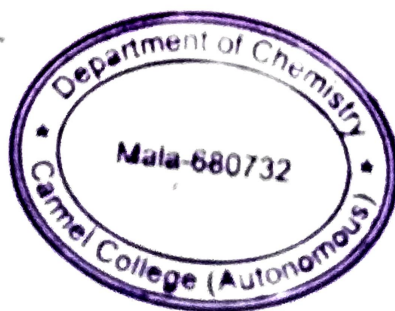
CERTIFICATE

This is to certify that the report on the project entitled "Green Synthesis of ZnO Nanoparticles: Assessing Antibacterial Efficacy" is a bonafide record of the work carried out by ARADHYA S (Reg No: CRAVSCH004) under my supervision and guidance towards the partial fulfilment of requirement for the award of the degree of Bachelor of Science in Chemistry at Carmel College (Autonomous), Mala in the academic year 2023-2024.

Poimay K. G. B.

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Faculty in charge

Dr. Vidya Francis
Assistant Professor

Submitted for project Evaluation held on

Examiners:

1)

[Signature] Dr. Rashmi. G.T

2)

[Signature] Anjali Jacob K.

Green Synthesis of ZnO Nanoparticles: Assessing Antibacterial Efficacy

Project report submitted to the University of Calicut for partial fulfilment of the
award of the degree of

B. Sc. Program in Chemistry

By

Ardra K B

CRAVSCH005

UNDER THE SUPERVISION OF

Dr. Vidya Francis

Assistant Professor

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Carmel College (Autonomous), Mala



DEPARTMENT OF CHEMISTRY

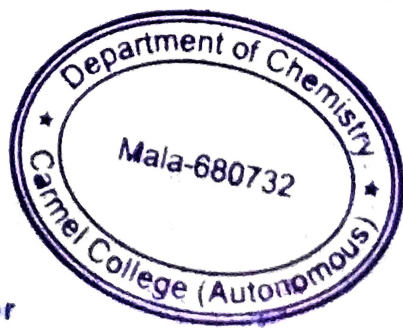
CARMEL COLLEGE (AUTONOMOUS), MALA


THRISSUR, KERALA

2023-2024


Supervisor

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Assistant Professor
Department of Chemistry




Head of the Department

Head
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Carmel College (Autonomous)
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CARMEL COLLEGE (AUTONOMOUS), MALA

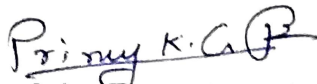
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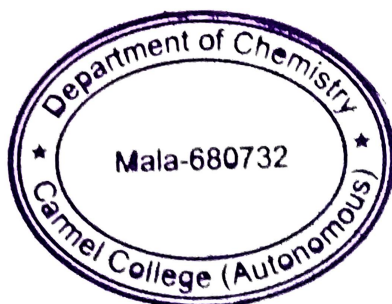
Mala-680732

CERTIFICATE

This is to certify that the report on the project entitled "**Green Synthesis of ZnO Nanoparticles: Assessing Antibacterial Efficacy**" is a bonafide record of the work carried out by **ARDRA K B (Reg No: CRAVSCH005)** under my supervision and guidance towards the partial fulfilment of requirement for the award of the degree of Bachelor of Science in Chemistry at Carmel College (Autonomous), Mala in the academic year 2023-2024.


Head of the Department

Head
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Carmel College (Autonomous)
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Faculty in charge

Dr. Vidya Francis
Assistant Professor

Submitted for project Evaluation held on ..22/3/24 .

Examiners:

1) Anjaly Jacob K.
DR. ANJALY JACOB K.

2) Dr. Roshini. K.T Roshini K.T.

Green Synthesis of ZnO Nanoparticles: Assessing Antibacterial Efficacy

Project report submitted to the University of Calicut for partial fulfilment of the
award of the degree of

B. Sc. Program in Chemistry

By

Athila V B

CRAVSCH006

UNDER THE SUPERVISION OF

Dr. Vidya Francis

Assistant Professor

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Carmel College (Autonomous), Mala

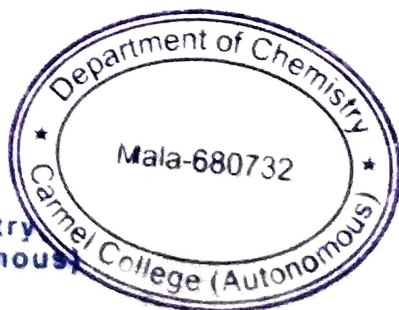


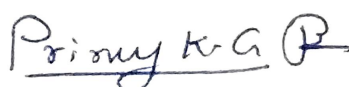
**DEPARTMENT OF CHEMISTRY
CARMEL COLLEGE (AUTONOMOUS), MALA
THRISSUR, KERALA**

2023-2024


Supervisor

**Dr. Vidya Francis
Assistant Professor
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Head of the Department

**Head
Department of Chemistry
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Mala-680732**



CARMEL COLLEGE (AUTONOMOUS), MALA

(Nationally Re-accredited with "A" grade)

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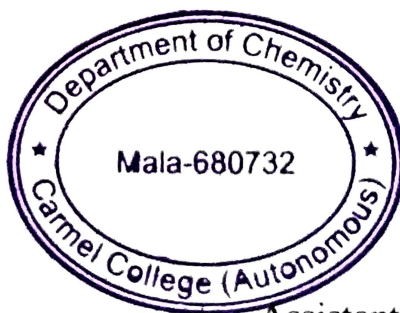
CERTIFICATE

This is to certify that the report on the project entitled "Green Synthesis of ZnO Nanoparticles: Assessing Antibacterial Efficacy" is a bonafide record of the work carried out by **ATHILA V B (Reg No: CRAVSCH006)** under my supervision and guidance towards the partial fulfilment of requirement for the award of the degree of Bachelor of Science in Chemistry at Carmel College (Autonomous), Mala in the academic year 2023-2024.

Princy K G P

Head of the Department

Head
Department of Chemistry
Carmel College (Autonomous)
Mala-680732



[Signature]

Faculty in charge

Dr. Vidya Francis

Assistant Professor

Submitted for project Evaluation held on

Examiners:

- 1) *Anjaly Jacob K.*
DR. ANJALY JACOB K.
- 2) *Rohini G.T.*
Dr. Rohini G.T.

**EXPLORING PLANT RESOURCES: EXTRACTION AND
CHARACTERIZATION OF NATURAL DYES FOR COTTON FABRICS**

Project report submitted to the University of Calicut for
partial fulfillment of the award of the degree of

B.Sc. Program in Chemistry

By

HARIPRIYA M H

CRAVSCH 007

Under the supervision of

Dr. PRINCY K G

Professor



DEPARTMENT OF CHEMISTRY

CARMEL COLLEGE (AUTONOMOUS), MALA

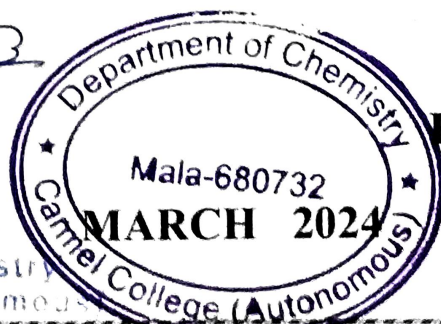
Re-accredited by NAAC with "A" grade(4th cycle)

Mala – 680732, Thrissur (Dt.), Kerala

Princy K G

Supervisor

Dr. Princy K.G.
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Princy K G

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CARMEL COLLEGE (AUTONOMOUS) MALA

Re-accredited by NAAC with "A" grade(4th cycle)

Affiliated to University of Calicut

Thrissur (Dt), Kerala – 680732, web: www.carmelcollegemala.ac.in, 0480-2890247

CERTIFICATE

This is to certify that the report on the project entitled "EXPLORING PLANT RESOURCES: EXTRACTION AND CHARACTERIZATION OF NATURAL DYES FOR COTTON FABRICS" is a bonafide record of the work carried out by HARI PRIYA M H (Reg. No. CRAVSCH007) under my supervision and guidance towards the partial fulfillment of requirement for the award of the degree of Bachelor of Science in Chemistry at Carmel College(Autonomous), Mala during the academic year 2023-2024.

Princy K-G

Head of the Department

Head

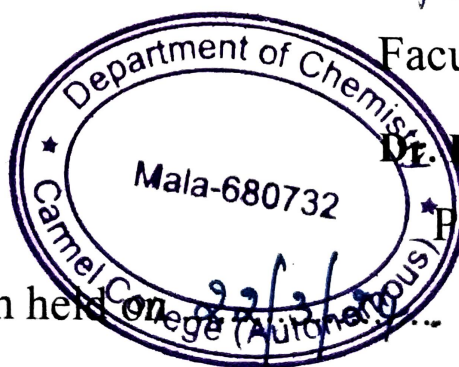
Department of Chemistry
Carmel College (Autonomous)
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Princy K-G

Faculty in charge

DR. PRINCY K G

Professor & Head
Department of Chemistry
Carmel College (Autonomous)
Mala-680732



Submitted for project evaluation held on 22/3/2024

Examiners:

1)

Rushini
Dr. Rushini. K.T

2)

Anjaly Jacob K.

DR. ANJALY JACOB K

**EXPLORING PLANT RESOURCES: EXTRACTION AND
CHARACTERIZATION OF NATURAL DYES FOR COTTON FABRICS**

Project report submitted to the University of Calicut for
partial fulfillment of the award of the degree of
B.Sc. Program in Chemistry

By

LAKSHMI K V

CRAVSCH 008

Under the supervision of

Dr. PRINCY K G

Professor



DEPARTMENT OF CHEMISTRY

CARMEL COLLEGE (AUTONOMOUS), MALA

Re-accredited by NAAC with "A" grade(4th cycle)

Mala – 680732, Thrissur (Dt.), Kerala

Princy K. G.
Supervisor

Dr. Princy K. G.
Professor & Head



Princy K. G.
Head of the Department

Head
Department of Chemistry
Carmel College (Autonomous)
Mala-680732



CARMEL COLLEGE (AUTONOMOUS) MALA

Re-accredited by NAAC with "A" grade(4th cycle)

Affiliated to University of Calicut

Thrissur (Dt), Kerala – 680732, web: www.carmelcollegemala.ac.in, 0480-2890247

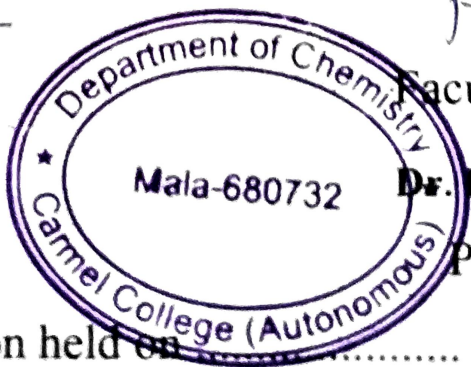
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Princy K. G

Head of the Department

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Princy K. G

Faculty in charge

Dr. PRINCY K G

Professor

Dr. Princy K. G.
Professor & Head
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Mala-680732

Submitted for project evaluation held on

Examiners:

1)

Roshini T Dr. Roshini. T

2)

Anjaly Jacob K.
Dr. ANJALY JACOB K.

**EXPLORING PLANT RESOURCES: EXTRACTION AND
CHARACTERIZATION OF NATURAL DYES FOR COTTON FABRICS**

Project report submitted to the University of Calicut for
partial fulfillment of the award of the degree of
B.Sc. Program in Chemistry

By

RENI K A

CRAVSCH009

Under the supervision of

Dr. PRINCY K G

Professor



DEPARTMENT OF CHEMISTRY

CARMEL COLLEGE (AUTONOMOUS), MALA

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Mala - 680732, Thrissur (Dt.), Kerala

Princy K. G. P.

Supervisor

Dr. Princy K G.
Professor & Head



Princy K. G. P.

Head of the Department

Head
Department of Chemistry



CARMEL COLLEGE (AUTONOMOUS) MALA

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Affiliated to University of Calicut

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Princy K A P

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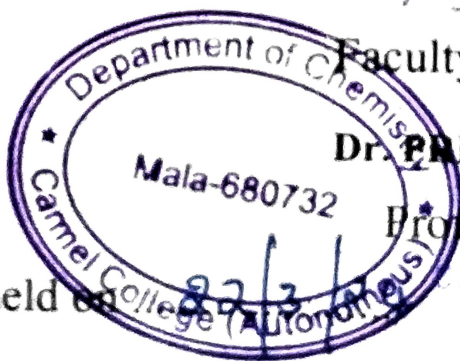
Princy K A P

Faculty in charge

Dr. PRINCY K G

Professor

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Carmel College (Autonomous)
Mala-680732



Submitted for project evaluation held on 27/3/24

Examiners:

- 1) *Anjaly Jacob K.*
DR. ANJALY JACOB K.
- 2) *DD AI*

**EXPLORING PLANT RESOURCES: EXTRACTION AND
CHARACTERIZATION OF NATURAL DYES FOR COTTON FABRICS**

Project report submitted to the University of Calicut for
partial fulfillment of the award of the degree of
B.Sc. Program in Chemistry

By

ASHALAKSHMI P

CRAVSCH011

Under the supervision of

Dr. PRINCY K G

Professor



DEPARTMENT OF CHEMISTRY

CARMEL COLLEGE (AUTONOMOUS), MALA

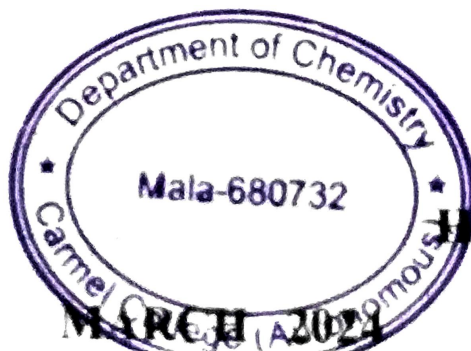
Re-accredited by NAAC with "A" grade(4th cycle)

Mala – 680732, Thrissur (Dt.), Kerala

Princy K. G.

Supervisor

Dr Princy K G
Professor & Head



Princy K. G.

**Head of the Department
Head**

Department of Chemistry
Carmel College (Autonomous)



CARMEL COLLEGE (AUTONOMOUS) MALA

Re-accredited by NAAC with "A" grade(4th cycle)

Affiliated to University of Calicut

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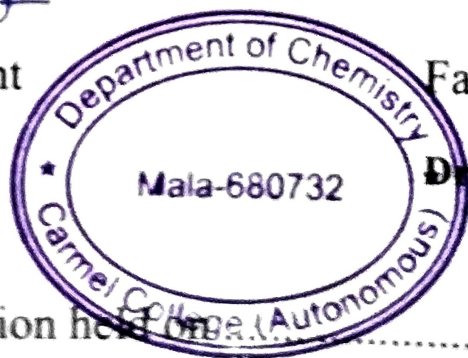
CERTIFICATE

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Princy K. G. R.

Head of the Department

Head
Department of Chemistry
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Princy K. G. R.

Faculty in charge

Dr. PRINCY K G

Professor
Dr. Princy K G
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Submitted for project evaluation held on

Examiners:

1)

Rashmi A Dr. Rashmi. G. T.

2)

Anjaly Jacob K.

EXPLORING PLANT RESOURCES: EXTRACTION AND CHARACTERIZATION OF NATURAL DYES FOR COTTON FABRICS

Project report submitted to the University of Calicut for partial fulfillment of the award of the degree of

B.Sc. Program in Chemistry

By

ASHMI CB

CRAVSCH012

Under the supervision of

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DEPARTMENT OF CHEMISTRY

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Thrissur (Dt), Kerala – 680732, web: www.carmelcollegemala.ac.in, 0480-2890247

CERTIFICATE

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Princy K. G. R.

Head of the Department

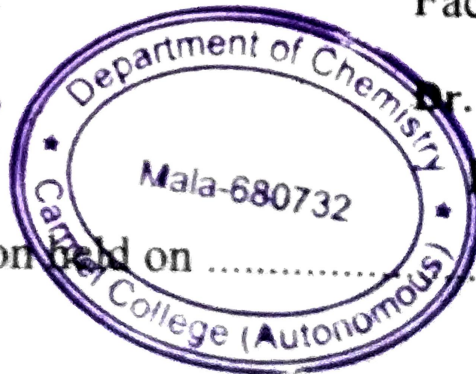
Head
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Princy K. G. R.

Faculty in charge

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Dr. Princy K. G.
Professor & Head
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Submitted for project evaluation held on

Examiners:

1)

Anjaly Jacob K.

**EXPLORING PLANT RESOURCES: EXTRACTION AND
CHARACTERIZATION OF NATURAL DYES FOR COTTON FABRICS**

Project report submitted to the University of Calicut for
partial fulfillment of the award of the degree of

B.Sc. Program in Chemistry

By

ASWATHY ASHOKAN

CRAVSCH013

Under the supervision of

Dr. PRINCY K G

Professor



DEPARTMENT OF CHEMISTRY

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Mala – 680732, Thrissur (Dt.), Kerala

Princy K.G.

Supervisor

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Professor & Head
Department of Chemistry Mala-680732



Princy K.G.

Head of the Department

Head

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Princy K. G. P.

Head of the Department

Head
Department of Chemistry
Carmel College (Autonomous)
Mala-680732

Princy K. G. P.

Faculty in charge

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Princy K. G.
Professor & Head
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Mala-680732

Submitted for project evaluation held on 22/3/24

Examiners:

1)

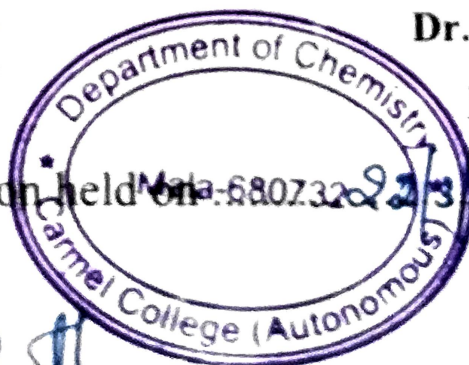
Rashmi

Dr. Rashmi. G. T.

2)

Anjaly Jacob K.

DR. ANJALY JACOB K.



Synthesis of CuO Nanoparticles from Ayapana Triplinervis: Exploring Antibacterial Efficacy and Phytochemical Analysis

Project report submitted to the University of Calicut for partial fulfilment of the
award of the degree of

B. Sc. Program in Chemistry

by

Deepika Das

CRAVSCH015

UNDER THE SUPERVISION OF

Dr. Roshini K. Thumpakara

Associate Professor

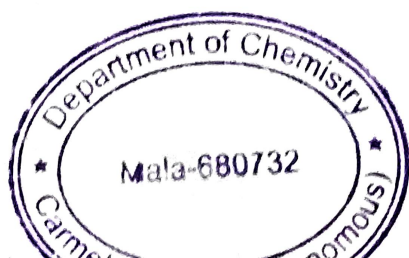
Department of Chemistry

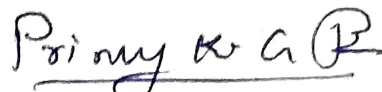
Carmel College (Autonomous), Mala



**DEPARTMENT OF CHEMISTRY
CARMEL COLLEGE (AUTONOMOUS), MALA
THRISSUR, KERALA
2023-2024**


Supervisor




Head of the Department
Head



CARMEL COLLEGE (AUTONOMOUS), MALA

(Nationally Re-accredited with "A" grade)

Affiliated to University of Calicut

Mala-680732

CERTIFICATE

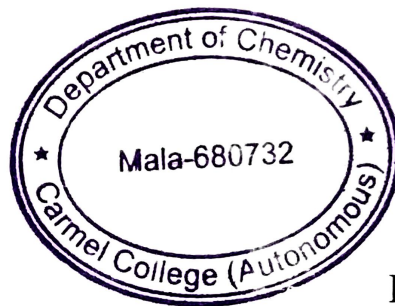
This is to certify that the report on the project entitled "Synthesis of CuO Nanoparticles from Ayapana Triplinervis: Exploring Antibacterial Efficacy and Phytochemical Analysis" is a bonafide record of the work carried out by **Deepika Das (Reg No. CRAVSCH015)** under my supervision and guidance towards the partial fulfilment of requirement for the award of the degree of Bachelor of Science in Chemistry at Carmel College (Autonomous), Mala in the academic year 2023-2024.

Poiny K. A. R.

Head of the Department

Head

Department of Chemistry
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Dr. Roshini K. Thumpakara

Faculty in charge

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Submitted for project Evaluation held on

Examiners:

1) *Dr. Udaya Francis* & *Anjaly Jacob K.*

2)

DR. ANJALY JACOB K.

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by

Hishana Fathima

CRAVSCH016

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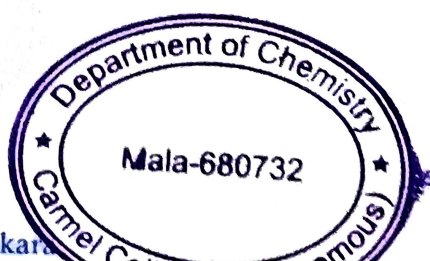
Carmel College (Autonomous), Mala



**DEPARTMENT OF CHEMISTRY
CARMEL COLLEGE (AUTONOMOUS), MALA
THRISSUR, KERALA
2023-2024**

Roshini K. Thumpakara
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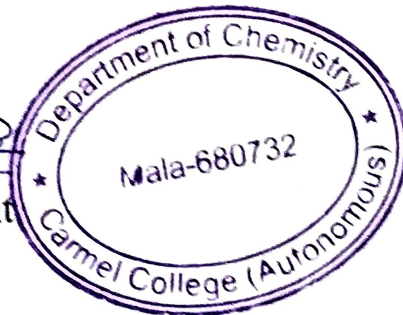
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Princy K-G R

Head of the Department

Head
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Roshini K

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Mala - 680732

Submitted for project Evaluation held on

Examiners:

1) *Dr. Udaya Francis*

2)

Anjaly Jacob K.
Dr. ANJALY JACOB K.

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B. Sc. Program in Chemistry

by

Keerthana Unnikrishnan

CRAVSCH017

UNDER THE SUPERVISION OF

Dr. Roshini K. Thumpakara


Associate Professor

Department of Chemistry

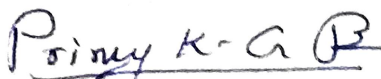
Carmel College (Autonomous), Mala



**DEPARTMENT OF CHEMISTRY
CARMEL COLLEGE (AUTONOMOUS), MALA
THRISSUR, KERALA
2023-2024**


Supervisor




Head of the Department



CARMEL COLLEGE (AUTONOMOUS), MALA

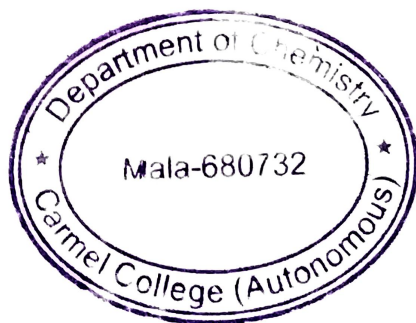
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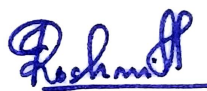
This is to certify that the report on the project entitled "Synthesis of CuO Nanoparticles from Ayapana Triplinervis: Exploring Antibacterial Efficacy and Phytochemical Analysis" is a bonafide record of the work carried out by **Keerthana Unnikrishnan** (Reg No. **CRAVSCH017**) under my supervision and guidance towards the partial fulfilment of requirement for the award of the degree of Bachelor of Science in Chemistry at Carmel College (Autonomous), Mala in the academic year 2023-2024.



Head of the Department

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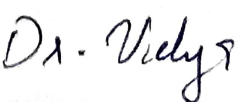
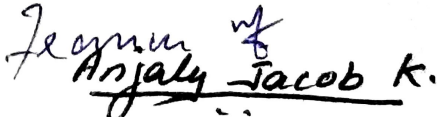
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Submitted for project Evaluation held on

Examiners:

1)  
Dr. ANJALY JACOB K.

2) 

Synthesis of CuO Nanoparticles from Ayapana Triplinervis: Exploring Antibacterial Efficacy and Phytochemical Analysis

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award of the degree of

B. Sc. Program in Chemistry

by

Riya A.R

CRAVSCH018

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Dr. Roshini K. Thumpakara

Associate Professor

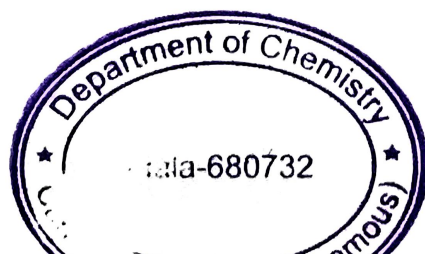
Department of Chemistry

Carmel College (Autonomous), Mala



**DEPARTMENT OF CHEMISTRY
CARMEL COLLEGE (AUTONOMOUS), MALA
THRISSUR, KERALA
2023-2024**

Roshini K. Thumpakara
Supervisor



Priya K. A. B.
Head of the Department
Head



CARMEL COLLEGE (AUTONOMOUS), MALA

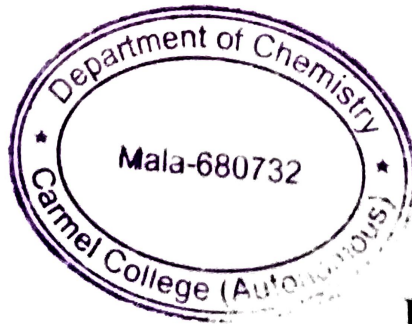
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Mala-680732

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Princy K. G. R.
Head of the Department

Head
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Roshini K. Thumpakara
Faculty in charge

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Submitted for project Evaluation held on

Examiners:

- 1) *Dr. Vidya Ferris* *Anjaly Jacob K.*
- 2) *DR. ANJALY JACOB K.*

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by

Sreenandana N.R

CRAVSCH020

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**DEPARTMENT OF CHEMISTRY
CARMEL COLLEGE (AUTONOMOUS), MALA
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2023-2024

Roshini K. Thumpakara
Supervisor

Dr. Roshini K. Thumpakara



Princy K. A. R.
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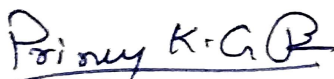
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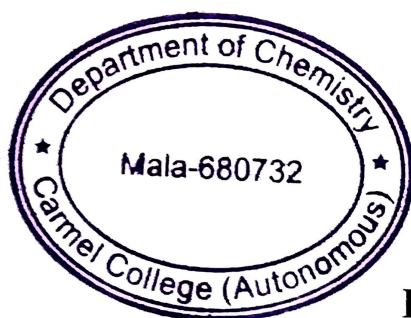
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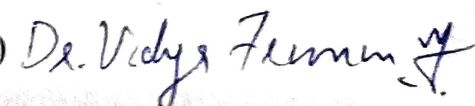


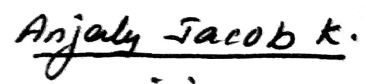

Faculty in charge

Dr. Roshini K. Thumpakara
Associate Professor
Dr. Roshini.K.Thumpakara
Associate Professor
Department of Chemistry
Carmel College (Autonomous)
Mala - 680732

Submitted for project Evaluation held on

Examiners:

1) 


DR. ANJALY JACOB K.

2)