

COMPARATIVE PHYSICOCHEMICAL ANALYSIS, TLC AND ANTIMICROBIAL STUDIES OF FOUR VARIETIES OF *Curcuma longa* Linn.

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to the University of Calicut and Nationally re-accredited by
NACC A++ & SAAC A+)

In partial fulfilment of the requirement for the award of the degree of

MASTER OF SCIENCE IN BOTANY

Submitted by

AISWARYA RAMESH

Reg. No: CCAVMBT001



Under the guidance of

Mr. BIJESHMON P

**Manager of QC, Sitaram Ayurveda (P) Ltd
Nedupuzha, Thrissur**

&

Under the Co-guidance of

SWEETY M.S

Guest lecturer,

Department of Botany,

Christ College (Autonomous), Irinjalakuda, Thrissur

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CERTIFICATE

This is to certify the Dissertation entitled “**COMPARATIVE PHYSICOCHEMICAL ANALYSIS, TLC AND ANTIMICROBIAL STUDIES OF FOUR VARIETIES OF CURCUMA LONGA L.**” submitted to the University of Calicut, in the partial fulfilment of the requirements for the award of the degree of **MASTER OF SCIENCE IN BOTANY** is a record of the original research work done by **Mrs. AISWARYA RAMESH (Reg. No.: CCAVMBT001)** during the period of February - March 2023 of her study in the **Quality Control Department (approved by Dept. of AYUSH, Govt. of India) at Sitaram Ayurveda Pvt. Ltd., Nedupuzha, Thrissur** under my supervision and guidance and the dissertation has not formed the basis for the award of any Degree/Diploma/ Associateship/ Fellowship or other similar title to any candidate in any university.

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DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut & Nationally accredited with A++ grade)

CERTIFICATE

This is to certify that the dissertation entitled “**COMPARATIVE PHYSICOCHEMICAL ANALYSIS, TLC AND ANTIMICROBIAL STUDIES OF FOUR VARIETIES OF *Curcumalonga* Linn.**” submitted by **Miss. AISWARYA RAMESH, Reg. No. CCAVMBTOO1**, IV semester M.Sc. Botany in partial fulfilment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bonafide record of the research work carried out by her under the supervision and guidance of **Mr. Bijeshmon P** Manager of QC, Sitaram Ayurveda (P) Ltd Nedupuzha, Thrissur and co-guidance of **Mrs. Sweety M.S** Guest lecturer, Department of Botany, Christ College (Autonomous), Irinjalakuda.

Irinjalakuda

Date:

Prof.E. J. Vincent
Co-ordinator
PG Department of Botany

Signature of Examiners:

1.....

2.....



DEPARTMENT OF BOTANY

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Irinjalakuda

SWEETY M.S

Date:

Supervising teacher
PG Department of Botany
Christ College (Autonomous),
Irinjalakuda

DECLARATION

I hereby declare that the dissertation work entitled “**COMPARATIVE PHYSICOCHEMICAL ANALYSIS ,TLC AND ANTIMICROBIAL STUDIES OF FOUR VARIETIES OF *Curcumalonga* Linn.**” submitted by **Miss. AISWARYA RAMESH, Reg. No. CCAVMBT001**,IV semester M.Sc. Botany in partial fulfilment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bona fide record of the research work carried out by me under the supervision and guidance of **Mr.Bijeshmon P** Manager of QC, Sitaram Ayurveda (P) Ltd Nedupuzha,Thrissur and under the co-guidance of **Mrs. Sweety M.S**,Guest lecturer, Department of Botany, Christ College (Autonomous), Irinjalakuda.

AISWARYA RAMESH

ACKNOWLEDGEMENT

First and foremost, I want to convey my thankfulness to God for blessing me in this venture and making my dissertation work successful.

I express my sincere gratitude to my project guide Mr. Bijeshmon P, Manager of QC, Sitaram Ayurveda (p) Ltd, Nedupuzha, Thrissur for his scientific guidance, advice, motivation and encouragement throughout the course of my project work and for providing the lab facilities needed for the work.

I am deeply grateful to Ms. Greeshma K M and Ms. Meera Mohan K, Botanists of the Pharmacognosy Department, and Ms. Ameena Sherin PS and Ms. Veena K, Microbiologists of Sitaram Ayurveda (p) Ltd, Nedupuzha, Thrissur for guiding and supporting me throughout my project work.

I utilize this opportunity to express my thanks to Ms. Sandhya V R and Ms. Smitha Francis, Botanist of the Pharmacognosy Department, Sitaram Ayurveda (p) Ltd. Nedupuzha, Thrissur for support and encouragement.

I would like to thank Reverend Fr. Dr. Jolly Andrews CMI, Principal, Christ College (Autonomous), Irinjalakuda for giving me the permission and facilities in Botany department of Christ College to complete my dissertation.

I also express my deep sense of gratitude to Prof. Vincent E. J., Coordinator, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda for his valuable ideas and support throughout the course of completing the project.

This work was conducted under the guidance of Mrs. Sweety M. S., Guest lecturer, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda. I am thankful to her, for helping and supporting me and guiding me throughout the period of this work.

I express my immense gratitude to all teachers of Department of Botany, Christ College (Autonomous), Irinjalakuda for their support and encouragement during the course of study. I thank our mighty God for helping me and giving me the ways for the completion of my work.

I also utilize this opportunity to express my thanks to my dear friends, sister, cousins and relatives for their cooperation, ideas and help rendered throughout this work. Last but not the least, I am indebted to my parents for their help, moral support and encouragement.

AISWARYA RAMESH

PREFACE

The present work entitled with “**COMPARATIVE PHYSICOCHEMICAL ANALYSIS, TLC AND ANTIMICROBIAL STUDIES OF FOUR VARIETIES OF *Curcumalong*Linn.**” was taken during the period of February – March, 2023 in the partial fulfilment of the requirements prescribed for the M.Sc. Degree in Botany of the University of Calicut. The research work was undertaken on a part time basis during IVth semester of the M.Sc. Degree course. The time basis during IVth semester of M.Sc. Degree course. The time prescribed for the dissertation was 7 hours per week during the IVth semester.

The present work is an attempt towards updating and recording the “**COMPARATIVE PHYSICOCHEMICAL ANALYSIS, TLC AND ANTIMICROBIAL STUDIES OF FOUR VARIETIES OF *Curcumalonga*Linn.**”

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ABSTRACT

Curcuma longa has been widely utilized in traditional medicine as a home cure for a number of illnesses and its anti-inflammatory, anti-cancer, anti-oxidant qualities may benefit mankind in a variety of ways. The aim of present study was to compare the physicochemical analysis, TLC and antimicrobial activity of four varieties of *Curcuma longa* rhizomes (Sona, Varna, Kanthi and Sobha). The physicochemical analysis reveals that variety varna shows highest values of total ash and insoluble ash as compared to other varieties studied. Highest Water-soluble extractive value and Alcohol soluble extractive value is seen in Kanthi. The components like curcumin, demethoxycurcumin present in the four varieties are quantified by analysing the TLC images. separation of curcuminoides contents in each variety are kept under study. This is very reliable and accurate method for the detection of component in the varieties. The antibacterial activity of methanol extract of rhizome of four varieties was tested against the microorganisms *Staphylococcus* Sp. (Gram positive bacteria) *E. coli*, *pseudomonas* Sp. and *klebsiella* Sp. (Gram negative bacteria). Agar well diffusion method is used. All the turmeric varieties showed significant inhibitory activities. In gram positive bacteria *Staphylococcus* Sp. variety Sobha shows highest inhibition zone while others varieties under study shows no inhibition zone. *E. coli*, *pseudomonas* Sp. and *Klebsiella* Sp. the inhibition zone is found to be highest in Sobha compared to others. The methanol extract possessed high antibacterial with a zone of inhibition. The variety sobha shows high antibacterial activity in all four microorganisms, and less activity in Sona. There is no antimicrobial activity in *staphylococcus* except studied variety Sobha. This all properties are utilised for treat various diseases and consider as an important medicinal plant. The information is benefited for the standardization of quality, purity and sample identification.

**BIOCHEMICAL EFFECTS OF SALICYLIC ACID PRIMING IN
ZINGIBER OFFICINALE ROSC. AGAINST SOFT ROT DISEASE**

A Dissertation Submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to the University of Calicut and Nationally

re-accredited by NAAC A⁺⁺ & SAAC A⁺ grade)

In partial fulfillment of the requirement for the award of the degree of

MASTER of SCIENCE in BOTANY

Submitted by,

AKHILA S

(Reg. No: CCAVMBT002)



Under the guidance of

Dr. SAYUJ K.P

Assistant Professor

Department of Biotechnology

Cochin University of Science & Technology

&

Under the co-guidance of

Ms. SWEETY M.S

Assistant Professor

P.G. Department of Botany

Christ College (Autonomous), Irinjalakuda

CHRIST COLLEGE(AUTONOMOUS)

IRINJALAKUDA, THRISSUR, KERALA-680125

2021-2023



P.G DEPARTMENT OF BOTANY
CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA
(Affiliated to University of Calicut & Nationally accredited with A++ grade)

CERTIFICATE

This is to certify that the dissertation entitled “ **BIOCHEMICAL EFFECTS OF SALICYLIC ACID PRIMING IN *ZINGIBER OFFICINALE* ROSC. AGAINST SOFT ROT DISEASE**” submitted to Christ College (Autonomous), Irinjalakuda, affiliated to the University of Calicut for the partial fulfilment for the award of the degree of Master of Science in Botany, Christ College (Autonomous), Irinjalakuda is a bonafide record of the research work carried out by **Ms. AKHILA S**, Reg. No: **CCAVMBT002** IVth semester M.Sc. Botany under the supervision and guidance of **Dr. Sayuj K.P** Assistant Professor, Department of Biotechnology, Cochin University of Science and Technology (CUSAT) and co-guidance of **Ms. Sweety M.S**, Assistant professor, P.G. Department of Botany, Christ College (Autonomous), Irinjalakuda. It is also certifying that no part of the present project work has formed the basis for the award of any other degree or diploma previously.

Irinjalakuda

Prof. E.J.Vincent

Date:

Co-ordinator

Signature of the Examiners

P. G Department of Botany

1.

2.



P.G DEPARTMENT OF BOTANY
CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA
(Affiliated to University of Calicut & Nationally accredited with A++ grade)

CERTIFICATE

This is to certify that the dissertation entitled “ **BIOCHEMICAL EFFECTS OF SALICYLIC ACID PRIMING IN *ZINGIBER OFFICINALE* ROSC. AGAINST SOFT ROT DISEASE**” submitted to Christ College (Autonomous), Irinjalakuda, affiliated to the University of Calicut for the partial fulfilment for the award of the degree of Master of Science in Botany, Christ College (Autonomous), Irinjalakuda is a bonafide record of the research work carried out by **Ms. AKHILA S**, Reg. No: **CCA VMBT002** IVth semester M.Sc. Botany under the supervision and co-guidance of **Ms. Sweety M.S**, Assistant professor, P.G. Department of Botany, Christ College (Autonomous), Irinjalakuda. It is also certifying that no part of the present project work has formed the basis for the award of any other degree or diploma previously.

Irinjalakuda
Date:

SWEETY M.S.
Supervising teacher
P.G. Department of Botany
Christ College (Autonomous)
Irinjalakuda

DECLARATION

I hereby declare that the dissertation work entitled “ **BIOCHEMICAL EFFECTS OF SALICYLIC ACID PRIMING IN *ZINGIBER OFFICINALE* ROSC. AGAINST SOFT ROT DISEASE**” submitted to Christ College (Autonomous), Irinjalakuda, affiliated to the University of Calicut for the partial fulfilment of the requirements for the award of Degree of Master of Science in Botany is a record of original research work done by me under the supervision and guidance of **Dr. Sayuj K.P** Assistant Professor, Department of Biotechnology, Cochin University of Science and Technology (CUSAT) and co-guidance of **Ms. Sweety M.S**, Assistant professor, P.G. Department of Botany, Christ College (Autonomous), Irinjalakuda. I further declare that the dissertation has not previously formed on the basis for the award of any Degree/Diploma/Fellowship/Associateship or any other similar title of recognition of any University or Institution.

Irinjalakuda

AKHILA S

Date:

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*First of all, I would like to thank the supreme power the Almighty God who is obviously the one has always guided me to work on the right path of my life. I would like to express my sincere gratitude to **Dr. Sayuj K.P.** Assistant Professor, Department of Biotechnology, Cochin University of Science and Technology (CUSAT), for his constant guidance throughout my work and also for his valuable suggestions and encouragement for the successful completion of my work.*

*I would also like to thank my co-guide **Mrs. Sweety M.S,** Assistant Professor, Christ College (Autonomous), Irinjalakuda for her critical guidance and support throughout my work. I hearty thank to **Mr. Sinoy Johnson,** Research Scholar Dept. of Biotechnology, CUSAT, for his help and guidance throughout my work.*

*I would like to extend my sincere thanks to **Prof. E.J Vincent** (Department Head), **Dr. C.J Mani** (Associate Professor), **Prof. Jacob Abraham Pulikkal** (Associate Professor), **Mrs. Sabeena A.M** (Assistant Professor) and **Mrs. Sreelakshmi V.V.** (Assistant Professor), Christ College (Autonomous), Irinjalakuda. Above all, I owe my words to express my thanks and admiration to my wonderful parents and all my dear friends for their unwavering encouragement and support in completing this work.*

AKHILA S

PREFACE

The present work entitled with “**BIOCHEMICAL EFFECTS OF SALICYLIC ACID PRIMING IN *ZINGIBER OFFICINALE* ROSC. AGAINST SOFT ROT DISEASE**” was undertaken during March 2023 in partial fulfillment of the requirement prescribed for the M.sc. Degree in Botany of the University of Calicut. The research was undertaken on a part-time basis during 4th semester of the M.Sc. Degree course. The prescribed for the dissertation was 7 hours per week during the 4th semester.

The present study aims for inducing resistance in *Zingiber officinale* Rosc. against soft rot disease and also the biochemical effects of salicylic acid as a priming agent.

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**BIOCHEMICAL EFFECTS OF SALICYLIC ACID PRIMING IN *ZINGIBER
OFFICINALE* ROSC. AGAINST SOFT ROT DISEASE**

ABSTRACT

The present investigation evaluated the effects of priming for inducing resistance in *Zingiber officinale* Rosc. against soft rot disease. Ginger is a tropical plant cultivated all over the world due to its medicinal and culinary properties. It is one of the most significant spices that is commonly used in food, which increases its commercial value. However, ginger production is frequently affected by the fungus *Pythium* spp., which causes soft rot (rhizome rot) disease. It is one of the most destructive diseases of ginger, which can cause a 50 to 90% reduction in production. Although the use of chemical fungicides is thought to be an efficient way to prevent ginger soft rot, excessive use is extremely dangerous for both the environment and human health. Therefore, it is necessary to create eco-friendly and economically feasible alternative ways for the effective management of the soft rot of ginger. The main aim of the study was to provide priming as a treatment method to induce and enhance resistance in ginger. Priming was performed using Salicylic acid (SA) by foliar spray method. The treated plant samples show enhanced resistance against disease. The preliminary results of the study suggest that priming can be used as an efficient method to induce resistance against pathogenic attack by increasing its defensive mechanisms and increasing the growth and development by increasing chlorophyll, carotenoid and lignin contents, etc.

**THE STUDY OF THE EFFECT OF DIFFERENT
TREATMENTS FOR THE SEED GERMINATION OF
BRASSICA OLERACEA L – AND *BETA VULGARIS L***

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut and Nationally re-accredited
by NAAC A⁺⁺ & SAAC A⁺ Grade)

In partial fulfillment of the requirement for the award of the Degree of
MASTER OF SCIENCE IN BOTANY

Submitted by

ALBIN JOSE

Reg.No: CCAVMBT003

Under the guidance of,

Mr. BIJESHMON P

Under the Co-guidance of,

Mrs. SREELAKSHMI. V.V.



**DEPARTMENT OF BOTANY
CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA
JUNE 2023**



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CHRIST COLLEGE (AUTONOMOUS) IRINJALAKUDA**

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CERTIFICATE

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Irinjalakuda

Prof. E. J. Vincent

Date :

Co-ordinator

P. G. Department of Botany

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Place: Nedupuzha

Signature of the Guide with Seal



Bijeshmon PP


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DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS) IRINJALAKUDA

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by NAAC A⁺⁺ & SAAC A⁺ Grade)

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Irinjalakuda

Sreelakshmi V. V.

Date :

Assistant professor

P.G. Department of Botany

DECLARATION

I hereby declare that the dissertation work entitled “THE STUDY OF THE EFFECT OF DIFFERENT TREATMENTS FOR THE SEED GERMINATION OF *BRASSICA OLERACEA L* – AND *BETA VULGARIS L*” Submitted to Christ College (autonomous) Irinjalakuda, affiliated to the University of Calicut. In partial fulfillment of the requirements for the award of degree of (**Master Science in**) Botany is a record of original research work done by me under the

I further declare that the dissertation has not formed on the basis for the award of Degree / Diploma / fellowship Association Ship or other similar title of any university or institution.

Irinjalakuda

ALBIN JOSE

Date

ACKNOWLEDGEMENT

First and foremost I would like to give all the glory and honor to the almighty God whose unbounded rays of blessings enriched my thoughts and deeds and gave me good health, strength and self-confidence.

I would like to thank Reverend Fr. Dr. Jolly Andrews CMI Principal, Christ college (Autonomous) Irinjalakuda for giving me the permission and facilities in Botany department of Christ College to complete my dissertation.

The work was conducted in Nedupuzha Sitaram ayurveda, under I express my Sincere thanks and gratitude to my project guide Bijeshmon P, Manager of QC, Sitaram Ayurveda (P) Limited, Nedupuzha, for his Scientific guidance, motivation throughout the course of my project work and for providing the lab facilities needed for the work.

I am gratefully thank to Ms Greeshma and Ms Meera botanist, of the Pharmacognosy department Sitaram Ayurveda (P) Limited for guiding and supporting me throughout my project work.

I also express my deeply sense of thanks to Prof E. J Vincent, coordinator of PG Department of Botany, Christ College (Autonomous) Irinjalakuda for giving valuable information and guidance throughout the period of my work.

This work was conducted under the guidance of Mrs. Sreelakshmi V.V. Guest lecture PG Department of Botany, Christ College (Autonomous) Irinjalakuda. I am thankful to her, for helping and supporting me and guiding me throughout the period of this work.

I am deeply indebted to Prof. Jacob Abraham Pulikal, Mrs Sabeenaa, Mrs Sweety, Dr. C. J Mani Prof. Assistant Professor PG Department of Botany. Christ College (Autonomous) Irinjalakuda. Their support were most helpful to me in all stages of this work.

I also utilize the opportunity to express my thanks to my dear friends, sister, cousins relatives for their co operations. Ideas and help rendered throughout this work. Lastly thank all of them who cooperated to bring this project to a success.

ALBIN JOSE

PREFACE

The present work with “THE STUDY OF THE EFFECT OF DIFFERENT TREATMENTS FOR THE SEED GERMINATION OF *BRASSICA OLERACEA L* – AND *BETA VULGARIS L*” was taken during the period of February – March 2023 in the partial fulfilment of the requirement for the award of Degree of Master of Science in Botany affiliated to the University of Calicut. The research was undertaken on a part time basis during IVth Semester of MSc Degree course. The time prescribe for the dissertation was 7 hours per week during IVth Semester.

The present work is to identify which seeds can overcome the dormancy period in both *Brassica Oleracea L* and *Beta Vulgaris L*.

**TO STUDY THE CULTIVABLE BACTERIAL DIVERSITY IN
INFECTED CASSAVA LEAVES**

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS) IRINJALAKUDA

(Affiliated to the University of Calicut & Nationally re-accredited with
NAAC A⁺⁺ grade and SAAC A⁺ grade)

In partial fulfilment of the requirements for the award of the degree of
MASTER OF SCIENCE IN BOTANY

Submitted by

ALEENA JOSEPH

(Reg.No. CCAVMBT004)



Under the guidance of

Dr SNEHA YOGINDRAN

Assistant Professor

Dept. of Biotechnology

CUSAT

&

Under the co-guidance of

Ms SABEENA A M

Guest lecturer

Dept. of Botany

Christ College (Autonomous), Irinjalakuda

DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS)

IRINJALAKUDA, THRISSUR, KERALA-680125

2021-2023



DEPARTMENT OF BIOTECHNOLOGY

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

COCHIN-682 022, INDIA, Phone : 0484-2576267

E-mail : biotech@cusat.ac.in Fax: 91-484-2576267, 2577595

Ref. No. DBT /Project/2023-24/221.

Date : 08.08.2023

CERTIFICATE

This is to certify that the project entitled "To study the cultivable bacterial diversity in infected cassava leaves" submitted to Christ college (Autonomous) Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of master of Botany, by Miss. ALEENA JOSEPH (CCAVMBT004) is an authentic work carried out by her at Cochin University of Science and Technology (CUSAT) under my guidance and supervision during the period of 1 March 2023- 31 March 2023. The matter embodied in this dissertation has not formed the basis for the award of any Degree/ Diploma/ Associate ship/ Fellowship to the best of my knowledge and belief. There is no objection to the content included in the thesis and presented as part of this work.

Dr. SNEHA YOGINDRAN
Assistant Professor,
Department of Biotechnology
Cochin University of Science and
Technology (CUSAT)
Kochi - 682022



Head of the Department

Professor & Head
Department of Biotechnology
Cochin University of Science & Technology
Kochi - 682 022, Kerala
Tel: 0484-2576267



DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut & Nationally accredited with A++ grade)

CERTIFICATE

This is to certify that the dissertation entitled “**TO STUDY THE CULTIVABLE BACTERIAL DIVERSITY IN INFECTED CASSAVA LEAVES**” submitted by **Miss ALEENA JOSEPH, Reg. No. CCAVMBT004**, IV semester M.Sc. Botany in partial fulfillment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bonafide record of the research work carried out by her under the supervision and guidance of **Dr Sneha Yogindran**, Assistant professor, Department of Biotechnology, Cochin University of Science and Technology (CUSAT).

Irinjalakuda

Date:

Prof. E. J. Vincent

Coordinator

PG Department of Botany

Signature of Examiners:

1.....

2.....



DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

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Irinjalakuda

Date:

SABEENA A M

Co guiding Teacher

PG Department of Botany

Christ College

(Autonomous)

Irinjalakuda

DECLARATION

I hereby declare that the thesis entitled “**TO STUDY THE CULTIVABLE BACTERIAL DIVERSITY IN INFECTED CASSAVA LEAVES**” submitted to Christ college (Autonomous) Irinjalakuda for partial fulfilment of the degree of Master of Science in Botany is a record of original and independent research work done by me under the guidance of **Dr. Sneha Yogindran, Assistant Professor, Department of Biotechnology (CUSAT)** and under the co-guidance of **Ms Sabeena A M**, Guest lecturer, Department of Botany, Christ College (Autonomous), Irinjalakuda. It has not been formed the basis for the award of any degree/ diploma/ associateship/ fellowship or other similar title to any candidate of any university.

ALEENA JOSEPH

ACKNOWLEDGEMENT

First of all, I would like to thank the Almighty God for showering his blessings to fulfill my project without any obstacles and for giving me strength to complete my work.

I would like to express my sincere gratitude to Dr Sneha Yogindran, Assistant professor, Department of biotechnology, Cochin University of Science and Technology, for her constant guidance throughout my work and also for her valuable suggestions and the encouragement for the successful completion of my work. I heartily thankful to MS Akshaya Unnikrishnan who gave me support and encouragement for the successful completion of my work.

This work was conducted under the co guidance of Ms Sabeena A M, Guest lecturer, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda. I am thankful to her, for helping and supporting me throughout the period of this work.

I express my immense gratitude to Prof. Vincent E.J (Head of department), and all teachers of Department of Botany, Christ College (Autonomous), Irinjalakuda for their support and encouragement during the course of study.

Above all, I owe my words to express my thanks and admiration to my wonderful parents and friends for their unwavering encouragement and support in completing this work.

ALEENA JOSEPH

PREFACE

The present work entitled with **“TO STUDY THE CULTIVABLE BACTERIAL DIVERSITY IN INFECTED CASSAVA LEAVES** “was undertaken during the period of 1st March – 31st March 2023 in partial fulfillment of the requirement prescribed for the M. Sc. Degree in Botany of University of Calicut. The research was undertaken on a part time basis during 4th semester of the M. Sc. Degree course. The prescribed for the dissertation was 9 hours per week during the 4th semester.

The present study aims to study the cultivable bacterial diversity in infected cassava leaves that is endemic to cassava mosaic virus disease. The main objectives of the study were morphological and biochemical characterization of bacterial isolates and molecular characterization of bacteria using universal primers.

**FLORISTIC ANALYSIS OF WETLAND PLANTS IN THE
SELECTED WETLANDS OF WARD XI, XII AND XVII OF
PUTHUR PANCHAYATH, THRISSUR DISTRICT, KERALA**

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut and Nationally re-accredited by
NAAC A++ & SAAC A+)

In partial fulfillment of the requirement for the award of the degree of

MASTER OF SCIENCE IN BOTANY

Submitted by

ALIDA DAVIS

(Reg. No: CCAVMBT005)

Under the guidance of,

SABEENA A. M.

Guest lecturer,

Department of Botany,

Christ College (Autonomous), Irinjalakuda



DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS),

IRINJALAKUDA

2021-2023



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CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

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This is to certify that the dissertation entitled “**Floristic analysis of wetland plants in the selected wetlands of ward XI,XII and XVII of Puthur Panchayath, Thrissur District, Kerala**”,submitted by **Miss ALIDA DAVIS, Reg. No. CCAVMBTOO5**, IV semester M.Sc. Botany in partial fulfillment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bonafide record of the research work carried out by her under the supervision and guidance of **Mrs.Sabeena A. M.**,Guest lecturer, Department of Botany, Christ College (Autonomous), Irinjalakuda.

Irinjalakuda

Date:

Prof. E. J. Vincent

Coordinator

PG Department of Botany

Signature of Examiners:

1.....

2.....



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Irinjalakuda

SABEENA A. M.

Date:

Supervising teacher

PG Department of Botany

Christ College (Autonomous)

Irinjalakuda

DECLARATION

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ALIDA DAVIS

ACKNOWLEDGEMENT

I would like to thank Reverend Fr. Dr. Jolly Andrews CMI, Principal, Christ College (Autonomous), Irinjalakuda for giving me the permission and facilities in Botany department of Christ College to complete my dissertation.

I also express my deep sense of gratitude to Prof. Vincent E. J., Coordinator, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda for his valuable ideas and support throughout the course of completing the project.

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I express my immense gratitude to all teachers of Department of Botany, Christ College (Autonomous), Irinjalakuda for their support and encouragement during the course of study.

I also extend my gratitude to Ms. Claudia Mathew for her assistance in the illustration of images.

I utilize this opportunity to express my thanks to Mr. Antony Francis, lab assistant, Department of Botany, Christ College (Autonomous), Irinjalakuda for his support and encouragement.

I thank our mighty God for helping me and giving me the ways for the completion of my work.

I also utilize this opportunity to express my thanks to my dear friends, sister, cousins and relatives for their cooperation, ideas and help rendered throughout this work. Last but not the least, I am indebted to my parents for their help, moral support and encouragement.

ALIDA DAVIS

**PHARMACOGNOSTICAL STANDARDISATION (PHYSICOCHEMICAL,
ANATOMICAL) AND TLC FINGERPRINT STUDIES OF *Struchium
sparganophorum* (L.) Kuntze**

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut and Nationally re-accredited
by NAAC A⁺⁺ & SAAC A⁺)

In partial fulfilment of the requirement for the award of the degree of

MASTER OF SCIENCE IN BOTANY

Submitted by,

ANAT FRANCIS

Reg. No: CCAVMBT006



Under the guidance of,

Mr. Bijeshmon P

QC Manager

**Sitaram Ayurveda Pvt.Ltd., Nedupuzha, Thrissur
&**

Under the co-guidance of

Mrs. SABEENA A.M.,

**Guest lecturer, Department of Botany
Christ College (Autonomous), Irinjalakuda**

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CERTIFICATE

This is to certify the Dissertation entitled **“PHARMACOGNOSTICAL STANDARDIZATION (PHYSICOCHEMICAL, ANATOMICAL) AND TLC FINGERPRINT STUDIES OF *STRUCHIUM SPARGANOPHORUM* (L.) KUNTZE.”** submitted to the University of Calicut, in the partial fulfilment of the requirements for the award of the degree of **MASTER OF SCIENCE IN BOTANY** is a record of the original research work done by **Ms. ANAT FRANCIS (Reg. No.: CCAVMBT006)** during the period of February – March 2023 of her study in the **Quality Control Department (approved by Dept. of AYUSH, Govt. of India) at Sitaram Ayurveda Pvt. Ltd., Nedupuzha, Thrissur** under my supervision and guidance and the dissertation has not formed the basis for the award of any Degree/Diploma/ Associateship/ Fellowship or other similar title to any candidate in any university.

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CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA**

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CERTIFICATE

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Irinjalakuda

Date:

Prof. E.J. Vincent
Co-ordinator
PG Department of Botany

Signature of the examiners:

1.

2.



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CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

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Irinjalakuda

Date:

SABEENA A. M.

Supervising teacher

PG Department of Botany

Christ college (Autonomous)

Irinjalakuda

DECLARATION

I hereby declare that the dissertation work entitled “**PHARMACOGNOSTICAL STANDARDISATION (PHYSICO CHEMICAL, ANATOMICAL) AND TLC FINGER PRINT STUDIES OF *Struchium sparganophorum* (L.) Kuntze** submitted by **Miss. ANAT FRANCIS Reg. No: CCAVMBT006**, IV semester M.Sc. Botany in partial fulfilment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bona fide record of the research work carried out by me under the supervision and guidance of **Mr. Bijeshmon P.**, under co-guidance of **Mrs. Sabeena A. M.**, Guest lecturer, Department of Botany, Christ College (Autonomous), Irinjalakuda.

ANAT FRANCIS

Irinjalakuda

Date:

ACKNOWLEDGEMENT

At first, I would like to express my deepest gratitude to almighty god whose unbounded rays of blessings helped me to have good thoughts, health, strength and self-confidence.

I would like to thank Rev.Fr. Jolly Andrews Principal, Christ College (Autonomous) Irinjalakuda for providing me permission and facilities to complete my dissertation in Christ College (Autonomous), Irinjalakuda, Kerala.

I also express my deep sense of gratitude to Prof. E.J. Vincent, Co-ordinator of Department of Botany, Christ College (Autonomous) Irinjalakuda who was giving me valuable guidance and thoughts throughout the course of completion of my project.

I would also like to thank Bijesh Sir, Manager, QC Department, Sitaram Ayurveda, Nedupuzha, Thrissur for allowing me to do my project with necessary facilities, guiding me throughout the course of my project.

I also extend my gratitude to Ms. Greeshma K M, Ms. Meera Mohan K, Botanists, QC Department, Sitaram Ayurveda and all others who have supported and helped me for the completion of my project.

The work was under the Co-guidance of Mrs. Sabeena A.M., Guest lecturer, P.G. Department of Botany, Christ College (Autonomous), Irinjalakuda. I am thankful to her, for helping, supporting and guiding me throughout the project.

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I utilize this opportunity to express my thanks to Mr. Antony, Lab Assistant of Department of Botany, Christ College (Autonomous), Irinjalakuda, for his help and support for this work.

I also utilize this opportunity to express my thanks to my dear friends, family for their cooperation, support and encouragement.

ANAT FRANCIS

ABSTRACT

Present study is to assess the Pharmacognostic and Thin Layer Chromatography of *Struchium sparganophorum* (L.) Kuntze. Fresh and shade dried leaves were collected and powdered for the study. Physicochemical criteria were done as per the procedure of Ayurvedic Pharmacopoeia of India. Whole plant powder was evaluated by Morphology, Powder analysis, Thin Layer Chromatography was valuated according to the procedures of Ayurvedic Pharmacopoeia. Values of Physico-chemical criteria like determination of total ash, water soluble ash, acid insoluble ash, alcohol soluble extractives were calculated. Result values of Physico-chemical studies are 14.685g(total ash), 1.913g(acid insoluble ash), 6.509g(alcohol soluble extractive), 27.202g(water soluble extractives). Methanol, Acetone, Chloroform extracts of *Struchium* was selected for TLC Analysis. Colours visuallised were Brown, Yellow, Pale green, Green, Violet. The pigments ensured presence of different metabolic compounds. With these results *Struchium sparganophorum* (L.) Kuntze was Standardised.

Keywords: *Struchium sparganophorum*, Anatomy, Pharmacognostical, Thin layer chromatography

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PHARMACOGNOSTIC CHARACTERIZATION AND COMPARATIVE STUDY OF FRUIT AND ROOT OF

Tribulus terrestris L.

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut and Nationally re-accredited
by NACC A⁺⁺ & SAAC A⁺)

In partial fulfilment of the requirement for the award of the degree of

MASTER OF SCIENCE IN BOTANY

Submitted by

ANEESHA PRAKASH
Reg. No: CCAVMBT007



Under the guidance of

Mr. Bijeshmon P. Manager Quality Control
Sitaram Ayurveda (P) Limited, Nedupuzha

&

Under the co-guidance of

Ms. Sreelakshmi V.V.
Assistant professor P.G. Department of Botany
Christ College (Autonomous), Irinjalakuda, Thrissur

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CERTIFICATE

This is to certify the Dissertation entitled “**PHARMACOGNOSTIC CHARACTERIZATION AND COMPARATIVE STUDY OF ROOT AND FRUIT OF *TRIBULUS TERRESTRIS L.***” submitted to the University of Calicut, in the partial fulfilment of the requirements for the award of the degree of **MASTER OF SCIENCE IN BOTANY** is a record of the original research work done by **Mrs. ANEESHA PRAKASH (Reg. No.:CCAVMBT007)** during the period of February - March 2023 of her study in the **Quality Control Department (approved by Dept. of AYUSH, Govt. of India) at Sitaram Ayurveda Pvt. Ltd., Nedupuzha, Thrissur** under my supervision and guidance and the dissertation has not formed the basis for the award of any Degree/Diploma/ Associateship/ Fellowship or other similar title to any candidate in any university

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Irinjalakuda

Date:

Prof. E. J. Vincent
Coordinator
P.G. Department of Botany

Signature of Examiners:

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2.....



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Irinjalakuda

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SREELAKSHMI V.V.

Supervising teacher

P.G. Department of Botany

Christ College (Autonomous)

Irinjalakuda

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ANEESHA PRAKSH

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I am deeply thankful to my guide Mr. Bijeshmon P., Manger quality control, Sitaram Ayurveda (P) Limited for taking me under his wing and guiding me until, i successfully complete my work.

I am also thankful to Ms. Greeshma K.M. , Ms. Meera Mohan and all other staffs at Sitaram Ayurveda (P) Limited for guiding and supporting me throughout my project work.

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I extent my deepest thanks to my parents for helping me throughout this journey and all the care they showed.

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ANEESHA PRAKASH

PREFACE

The present work entitled with “**Pharmacognostic characterization and comparative study of fruit and root of *Tribulus terrestris* L.**” was taken during the period of January - March, in the partial fulfilment of the requirement prescribed for the M. Sc Degree in Botany of the University of Calicut. The research work was taken on a part time basis during IVth semester of the M. Sc Degree course, the time prescribed for the dissertation was 7 hours per week during the IVth semester.

The present work is an attempt towards updating and recording the “**Pharmacognostic characterization and comparative study of fruit and root of *Tribulus terrestris* L.**”

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SYMBIOTIC SEED GERMINATION OF *Vanda tessellata*, A MEDICINAL ORCHID OF WESTERN GHATS

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut and Nationally re-accredited
by NACC A⁺⁺ & SAAC A⁺)

In partial fulfilment of the requirement for the award of the degree of

MASTER OF SCIENCE IN BOTANY

Submitted by

ARSHAL SEBASTIAN SAIZA

Reg. No: CCAVMBT008



Under the guidance of

Dr. S. William Decruse

Principal scientist, Department of Biotechnology
Jawaharlal Nehru Tropical Botanic Garden & Research Institute,
Palode

&

Under the co-guidance of

Ms. Sreelakshmi V.V.

Assistant professor P.G. Department of Botany
Christ College (Autonomous), Irinjalakuda, Thrissur

**DEPARTMENT OF BOTANY
CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA
2021-2023**

CERTIFICATES



DR. S. William Decruse

21-03-2023

CERTIFICATE

This is to certified that the project entitled “Symbiotic seed germination of *Vanda tessellata*, a medicinal orchid of Western Ghats” submitted by Mr. Arshal Sebastian Saiza (Reg.No.CCAVMBT008), Department of Botany, Christ College, Irinjalakuda affiliated to Calicut University, Kerala in partial fulfillment of the requirements of the Master of science in Botany 2021-2023 is an authentic record of research work carried out by him under my supervision and no part of these has been presented earlier for any other degree or fellowship.

Dr. S. William Decruse
Principal Scientist & HOD
Biotechnology and Bioinformatics Division



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(Affiliated to University of Calicut & Nationally accredited with A++ grade)

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This is to certify that the dissertation entitled “**Symbiotic seed germination of *Vanda tessellata*, a medicinal orchid of Western Ghats**” submitted by **Mr. ARSHAL SEBASTIAN SAIZA, Reg. No. CCAVMBTOO8**, IV semester M. Sc. Botany in partial fulfilment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bona fide record of the research work carried out by her under the supervision and guidance of **Dr. S. William Decruse.**, principal scientist at Jawaharlal Nehru Tropical Botanic Garden & Research Institute, Palode and under the co guidance of **Ms. Sreelakshmi V.V.** assistant professor, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda.

Irinjalakuda

Date:

Prof. E. J. Vincent
Coordinator
P.G. Department of Botany

Signature of Examiners:

1.....

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Irinjalakuda

Date:

SREELAKSHMI V.V.

Supervising teacher

P.G. Department of Botany

Christ College (Autonomous)

Irinjalakuda

DECLARATION

DECLARATION

I hereby declare that the dissertation work entitled “**Symbiotic seed germination of *Vanda tessellata*, a medicinal orchid of Western Ghats**” submitted by **Mr. ARSHAL SEBASTIAN SAIZA**, **Reg. No. CCAVMBTOO8**, IV semester M. Sc. Botany in partial fulfilment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bona fide record of the research work carried out by me under the supervision and guidance of **Dr. S. William Decruse.**, principal scientist at Jawaharlal Nehru Tropical Botanic Garden & Research Institute, Palode and under the co guidance of **Ms. Sreelakshmi V.V.** assistant professor, P.G. Department of Botany, Christ College (Autonomous), Irinjalakuda.

SAIZA

ARSHAL SEBASTIAN

**FLORISTIC ANALYSIS OF PLANTS IN THE SELECTED
WARD-XXXI OF IRINJALAKUDA MUNICIPALITY, THRISSUR
DISTRICT, KERALA**

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA
**(Affiliated to University of Calicut & Nationally accredited with
NAAC A++ & SAAC A+ grade)**

In partial fulfillment of the requirement for the award of the degree of

MASTER OF SCIENCE IN BOTANY

Submitted by

DIVYA P.S

Reg. No: CCAVMBT009

Under the guidance of,

SABEENA A. M.

Guest lecturer,

Department of Botany,

Christ College (Autonomous), Irinjalakuda



DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

2021 - 2023



DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut & Nationally accredited with
A++ grade)

CERTIFICATE

This is to certify that the dissertation entitled “**Floristic analysis of plants in the selected ward XXXI of Irinjalakuda Municipality, Thrissur District, Kerala**”, submitted by **Miss DIVYA P.S Reg. No. CCAVMBT009**, IV semester M.Sc. Botany in partial fulfillment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bona fide record of the research work carried out by her under the supervision and guidance of **Mrs. Sabeena A. M.**, Guest lecturer, Department of Botany, Christ College (Autonomous), Irinjalakuda.

Irinjalakuda

Date:

Prof. E. J. Vincent

Coordinator

PG Department of Botany

Signature of Examiners:

1.....

2.....



DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut & Nationally accredited with
A++grade)

CERTIFICATE

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Irinjalakuda

Date:

SABEENA A. M.

Supervising teacher

PG Department of Botany

Christ College Autonomous

Irinjalakuda

DECLARATION

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DIVYA P.S

ACKNOWLEDGEMENT

I would like to thank Reverend Fr. Dr. Jolly Andrews CMI, Principal, Christ College (Autonomous), Irinjalakuda for giving me the permission and facilities in Botany department of Christ College to complete my dissertation.

I also express my deep sense of gratitude to Prof. Vincent E. J., Coordinator, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda for his valuable ideas and support throughout the course of completing the project.

This work was conducted under the guidance of Mrs. Sabeena A. M., Guest lecturer, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda. I am thankful to her, for helping and supporting me and guiding me throughout the period of this work.

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I thank our mighty God for helping me and giving me the ways for the completion of my work.

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DIVYA P.S

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**ISOLATION AND CHARACTERIZATION OF PATHOGEN DEPICTING SOFT
ROT SYMPTOMS IN *ZINGIBER OFFICINALE* ROSC.**

*Project report submitted to
Christ College (Autonomous) Irinjalakuda
(Affiliated to the University of Calicut and Nationally re-accredited
by NAAC A++ & SAAC A+ grade)*

in partial fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE IN BOTANY

By

FASEEH K

(Reg. No. CCAVMBT010)



Under the guidance of

Dr. Sayuj K. P.

Assistant Professor

Dept. of Biotechnology

CUSAT

&

Under the co-guidance of

Ms. Sreelakshmi V. V.

Assistant Professor

Dept. of Botany

Christ College (Autonomous), Irinjalakuda

DEPARTMENT OF BOTANY

CHRIST COLLEGE(AUTONOMOUS), IRINJALAKUDA, THRISSUR

2021-2023



DEPARTMENT OF BIOTECHNOLOGY

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

COCHIN-682 022, INDIA, Phone : 0484-2576267

E-mail : biotech@cusat.ac.in Fax: 91-484-2576267, 2577595

Ref. No. DBT /Project/2023-2024

Date : 08.08.2023

CERTIFICATE

This is to certify that the project titled “ISOLATION AND CHARACTERIZATION OF PATHOGEN DEPICTING SOFT ROT SYMPTOMS IN *ZINGIBER OFFICINALE ROSC.*” A bonafide work done by **Mr. Faseeh K**, M.Sc. Botany student from the Department of Botany, Christ College (Autonomous), Irinjalakuda-680125, who carried out work under my supervision in the Plant Biotechnology Lab, Department of Biotechnology, Cochin University of Science and Technology, Cochin-682022, from 01 march 2023 to 31 march 2023.

Place: Cochin
Date: 08/08/2023

Dr. Sayuj K. P.
Assistant Professor,
Department of Biotechnology,
Cochin University of Science and Technology,
Cochin-682022, India

Professor & Head
Department of Biotechnology
Cochin University of Science & Technology
Kochi 682 022, Kerala
Tel 0484-2576267





CHRIST COLLEGE (AUTONOMOUS)

IRINJALAKUDATHRISSUR

Reaccredited by NAAC with A++ grade

POST GRADUATE DEPARTMENT OF BOTANY

IRINJALAKUDA-680125, KERALA

CERTIFICATE

This is to certify that the project titled *“Isolation and characterization of pathogen depicting soft rot symptoms in Zingiber officinale Rosc.”* submitted to Christ College (Autonomous), Irinjalakuda, affiliated to the University of Calicut for the partial fulfillment for the award of the degree of Master of Science in Botany, Christ College (Autonomous), Irinjalakuda is a bonafide record of the research work carried out by Mr. Faseeh K., (Reg. No: CCAVMBT010) under the supervision and guidance of **Dr. Sayuj K. P.**, Assistant Professor, Department of Biotechnology (CUSAT), and under the co guidance of **Ms. Sreelakshmi V. V.**, Assistant Professor, Department of Botany, Christ College (Autonomous), Irinjalakuda. It is also certifying that no part of the present work has formed the basis for the award of any other degree or diploma previously.

Place: Irinjalakuda

Date:

Signature of Examiners

1.

2.

PROF. E. J. VINCENT

Coordinator

P. G. Department of Botany



CHRIST COLLEGE (AUTONOMOUS)
IRINJALAKUDATHRISSUR

Reaccredited by NAAC with A++ grade

POST GRADUATE DEPARTMENT OF BOTANY

IRINJALAKUDA-680125, KERALA

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Place: Irinjalakuda

Date:

SREELAKSHMI V. V.

Assistant Professor

P. G. Department of Botany

Christ college (Autonomous), Irinjalakuda

DECLARATION

I hereby declare that the project entitled “*Isolation and characterization of pathogen depicting soft rot symptoms in Zingiber officinale Rosc*” submitted by me to Christ College (Autonomous), Irinjalakuda, in partial fulfilment of the requirement for the award of the degree of **Master of Science in Botany** is a record of bonafide project work carried out by me under the supervision and guidance of **Dr. Sayuj K. P.**, Assistant Professor, Dept. of Biotechnology (CUSAT), and under the co-guidance of **Ms. Sreelakshmi V. V.**, Assistant Professor, Christ college (Autonomous) Irinjalakuda. I further declare that the work reported in this project has not been submitted, either in part or in full, for the award of any other degree in any institute or university

Place: Irinjalakuda

FASEEK

Date:

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First of all, I would like to thank the Almighty God for showering his blessing to fulfil my project without any obstacles and for giving me strength to complete my work.

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*I would also like to thank my co-guide **Ms. Sreelakshmi V. V.**, Assistant professor, Christ College (Autonomous), Irinjalakuda for her critical guidance throughout my work. My hearty thanks to **Mr. Sinoy Johnson**, Research scholar, Dept. of Biotechnology, CUSAT, for his help and guidance throughout my work.*

*I would like to extend my sincere thanks to **Fr. Dr. Jolly Andrews CMI**(Principal), **Prof. E. J. Vincent** (Department Head), **Dr. C. J. Mani** (Associate Professor), **Prof. Jacob Abraham Pulikkal** (Associate Professor), **Ms. Sabeena A. M.** (Assistant Professor) and **Ms. Sweety M. S.** (Assistant Professor), Christ College (Autonomous), Irinjalakuda.*

Above all, I owe my words to express my thanks and admiration to my wonderful parents and all my dear friends for their unwavering encouragement and support in completing this work

FASEEH K

PREFACE

The present work entitled with ***“Isolation and characterization of pathogen depicting soft rot symptoms in Zingiber officinale Rosc”*** was taken during the period of 1 march 2023 to 31 march 2023 in the partial fulfillment of the requirements prescribed for the M. Sc. Degree in Botany of the University of Calicut. The research work was undertaken on a part-time basis during IV th semester of the M. Sc. Degree course. The time prescribed for the dissertation was 7 hours per during the IV th semester.

The present work is an attempt towards updating and recording the ***“Isolation and characterization of pathogen depicting soft rot symptoms in Zingiber officinale Rosc.”***

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**ALLELOPATHIC POTENTIAL AND HPTLC ANALYSIS OF
ANTIGONON LEPTOPUS HOOK. & ARN.
ON SEED GERMINATION AND SEEDLING GROWTH OF
VIGNA UNGUICULATA (L.) AND
ABELMOSCHUS ESCULENTUS L.**

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut and Nationally reaccredited

by NAAC A++ & SAAC A+ Grade)

In partial fulfilment of the requirement for the award of the degree of

MASTERS OF SCIENCE IN BOTANY

Submitted by

NAWAL. P. P

Reg No : CCAVMBT011



Under the guidance of,

DR. R. SOUMYA

Assistant Professor, Department of Botany

Christ College (Autonomous), Irinjalakuda

&

Under the co- guidance of,

Ms. SABEENA A. M

Assistant Professor, Department of Botany

Christ College (Autonomous), Irinjalakuda

DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS) IRINJALAKUDA

2021-2023



DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut & NAAC accredited with 'A++' grade)

CERTIFICATE

This is to certify the dissertation entitled “**Allelopathic potential and HPTLC analysis of *Antigonon leptopus* Hook. & Arn. on seed germination and seedling growth of *Vigna unguiculata* (L.) Walp and *Abelmoschus esculentus* L.**” Submitted by **Miss NAWAL P. P** Reg No. **CCAVMBT011** IVth semester M.Sc. Botany in partial fulfillment for the award of degree **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bonafide record of the research work carried out by her under the supervision and guidance of **Dr. R. Soumya**, Assistant Professor, Department of Botany, Christ College (Autonomous), Irinjalakuda.

Irinjalakuda

Date:

Prof. E. J. Vincent

Coordinator

P. G Department of Botany

Signature of Examiners:

1.....

2.....



DEPARTMENT OF BOTANY

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Irinjalakuda

Date:

DR. R. SOUMYA

Assistant Professor

Department of Botany

Christ College (Autonomous)

Irinjalakuda

DECLARATION

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NAWAL. P. P

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I thank our mighty God for helping me, giving me the ways for completing my work and also good health and self confidence while doing the work.

I would like to thank the Reverend Fr. Dr. Jolly Andrews CMI, Principal, Christ College (Autonomous) Irinjalakuda for giving me the permission and facilities in the Botany lab of Christ College to complete my dissertation.

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I express my immense gratitude towards Dr. C J Mani, Prof Jacob Abraham Pulikal, Mrs. Sabeena A. M, Mrs. Sweety M.S, Mrs. Sreelakshmi V. V. for their support and encouragement during the course of study.

I also utilize this opportunity to express my thanks to Mr. Antony Francis, Lab assistant, Department of Botany, Christ College (Autonomous) Irinjalakuda for his support and cooperation.

I also utilize this opportunity to express my thanks to my dear friends for the cooperation and their valuable suggestions. Last but not least, I am indebted to my parents, Abdul Hameed. P. P and Mumthaz. P. V and especially my siblings and my friend Saniga S. for their support and encouragement.

NAWAL P. P

ABSTRACT

Allelopathy is a biological process where the allelochemicals produced by a plant influences the growth, survival, development, and reproduction of other plants. Present study was intended to analyze the allelopathic potential and HPTLC analysis of *Antigonon leptopus* Hook. & Arn. on seed germination and seedling growth of *Vigna unguiculata* (L.) Walp. and *Abelmoschus esculentus* L. The germination studies were conducted under laboratory conditions for five days. Germination parameters - germination percentage, vigour index, growth index, radicle and hypocotyl length, fresh and dry weight were studied at various concentrations, and the value these parameters were found to be inversely proportional to concentration of extracts. The morphological parameters were studied by taking seeds in separate polythene bags containing field soil and the observations were recorded for 14 days. The morphological parameters include number of leaves, leaf area, fresh weight, dry weight, root length of the seedling and height of the seedling. These parameters also dwindled with the increasing concentrations. HPTLC analysis was also conducted to determine the presence of various phytochemicals present in *Antigonon leptopus* Hook. & Arn. Understanding the phytochemicals of invasive plants helps in the better management of weed crops by checking its germination rate. It also helps in the enhanced utilization of invasive plants in turn reducing its impact on biodiversity.

Key words: Allelopathy, Antigonon, Vigna, Abelmoschus, seed germination, seedling growth, HPTLC.

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**SEEDLING LEAF ANATOMY OF SIX BAMBOO SPECIES BELONGING
TO THE GENERA DENDROCALAMUS NEES. AND BAMBUSA SCHREB.**

A Dissertation Submitted to

Christ College (Autonomous), Irinjalakuda,

(Affiliated to the University of Calicut and Nationally re-accredited
by NAAC A⁺⁺ & SAAC A⁺ grade)

In partial fulfilment of the requirement for the award of the degree of

MASTER of SCIENCE in BOTANY

Submitted by,

NAZIYA K

(Reg No: CCAVMBT012)



Under the Guidance of

Dr. V. B. Sreekumar

**Principal scientist, Department of Forest Botany
Kerala Forest Research Institute, Peechi, Thrissur**

&

Under the co-guidance of

Prof. E. J. Vincent,

**Co-Ordinator of P. G. Department of Botany,
Christ College (Autonomous), Irinjalakuda, Trissur**

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

2021-2023



KSCSTE-Kerala Forest Research Institute

(An Institution under Kerala State Council for Science, Technology and Environment)
Peechi - 680 653, Thrissur, Kerala, India



CERTIFICATE

This is to certify that the Dissertation, entitled “SEEDLING LEAF ANATOMY OF SIX BAMBOO SPECIES BELONGING TO THE GENERA DENDROCALAMUS NEES. AND BAMBUSA SCHREB.”, submitted to the University of Calicut, in partial fulfilment of the requirements for the award of the Degree of **MASTER OF SCIENCE IN BOTANY** is a record of original research work done by **Ms. NAZIYA K (Reg. No. CCAVMBT012)** during the period January to March 2023 of her study in the **Department of Forest Botany** at **KSCSTE – Kerala Forest Research Institute**, under my supervision and guidance. The dissertation has not formed the basis for awarding any Degree/ Diploma/ Associateship/ Fellowship or other similar titles to any candidate in any University.

Place : Peechi

Date : 07-08-2023

Signature of the Guide with seal

Dr. V. B. Sreekumar
Principal Scientist & Head
Forest Botany Department
KSCSTE - Kerala Forest Research Institute
Peechi - 680 653, Thrissur, Kerala



P. G DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut & Nationally re-accredited by NAAC with 'A++' grade)

CERTIFICATE

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Irinjalakuda

Prof. E.J.Vincent

Date:

Co-ordinator

Signature of the Examiners

P. G. Department of Botany

1.

2.



P. G DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

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Irinjalakuda

Prof. E.J.Vincent

Date:

Co-ordinator

P. G. Department of Botany

DECLARATION

I hereby declare that the dissertation work entitled "**SEEDLING LEAF ANATOMY OF SIX BAMBOO SPECIES BELONGING TO THE GENERA DENDROCALAMUS NEES AND BAMBUSA SCHREB.**" submitted to Christ College (Autonomous), Irinjalakuda, affiliated to the University of Calicut for the partial fulfilment of the requirements for the award of Degree of Master of Science in Botany is a record of original research work done by me under the supervision and guidance of **Dr. V. B. Sreekumar** Principal scientist, Department of Forest Botany Kerala Forest Research Institute, Peechi, Thrissur and co-guidance of **Prof. E. J. Vincent**, Co-Ordinator of P.G. Department of Botany, Christ College (Autonomous), Irinjalakuda. I further declare that the dissertation has not previously formed on the basis for the award of any Degree/Diploma/Fellowship/Associateship or any other similar title of recognition of any University or Institution.

Irinjalakuda

Naziya K.

Date:

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First and foremost, I want to convey my thankfulness to God for blessing me in this venture and making my dissertation work successful.

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I'm extremely thankful to Fr. Dr. Jolly Andrews CMI, Principal, Christ College (Autonomous), Irinjalakuda, for providing a helping hand throughout this project.

I respectfully express my deep sense of thanks to Prof. E. J. Vincent, Head of Department of Botany, Christ College (Autonomous), Irinjalakuda, for permitting me to complete my project work by giving valuable support and guidance.

I'm deeply indebted to Mrs. Sreelakshmi V. V., Mrs. Sweety M.S., Mrs. Sabeena A. M., Dr. C. J. Mani, Prof. Jacob Abraham Pulikkal, Assistant Professors, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda and Mr. Antony, Lab Assistant of Department of Botany, for their help, encouragement and motivation throughout the course of time.

Without the cooperation and support from my friends and moral encouragement from my family, I would have not been able to complete my work. So, I would like to convey my profound gratitude to everyone for helping me.

NAZIYA K.

PREFACE

The present work with entitled “**SEEDLING LEAF ANATOMY OF SIX BAMBOO SPECIES BELONGING TO THE GENERA DENDROCALAMUS NEES. AND BAMBUSA SCHREB.**” was taken during the period of February – April of 2023 in the partial fulfilment of the requirement for the award of Degree of Master of Science in Botany affiliated to the University of Calicut. The research work was undertaken on a part time basis during IVth semester of M.Sc. Degree course. The time prescribed for the dissertation was 7 hours per week during the IVth semester.

The present work is an attempt towards recording and updating the comparison on leaf anatomy of six seedling bamboo species belonging to the genera *Dendrocalamus* and *Bambusa*.

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ABSTRACT

Identification of bamboo species in the seedling stage is a very difficult task and often happens mixing of different species which will create problems when establishing large-scale bamboo plantations. If we can able to identify the bamboo species using anatomical features especially epidermal cells and other features, it will be helpful for famers and other stakeholders. In this project, seedlings of different bamboo species were collected from the nursery of the Kerala Forest Research Institute and anatomical features were studied. The following six bamboo species from two genera were chosen: *Dendrocalamus brandisii*, *D. longispathus*, *D. stocksii*, *Bambusa polymorpha*, *B. tulda*, and *B. bambos*. To create microscope slides, the gathered leaf specimens were cut into sections, stained, and mounted. Each species sample slides were examined under a light microscope. A complex vascular system in the midrib, fusoid cells and lobed chlorophyllous elements in the mesophyll, vascular bundles with a double sheath, and an epidermis with long and short cells, bulliform cells, stomata, trichomes, micro-hairs, prickles, and saddle and dumb bell-shaped silica bodies are among the anatomical characteristics seen in the six species under study. The epidermis of bamboo leaves in various forms contains crystals that are dispersed. Both sunken and raised bulliform cells were detected in the upper epidermal cells of the majority of species. Trichomes were numerous and broadly distributed on the abaxial sides which are in unicellular papillary and filiform types. The presence of crystals in *D. brandisii*, *D. longispathus*, and *D. stocksii* were distinguishing features of these genera. Micro hairs were distributed on both the epidermal sides of *Dendrocalamus* and *B. tulda*, while they were seen on the abaxial sides of *B. polymorpha* and *B. bambos*. Complex and simple types of vascular bundles were seen on the midrib and the lamina.

**A PELIMINARY STUDY ON TAXONOMIC AND
MEDICINAL PLANTS IN PANANCHERY GRAMA
PANCHAYATH, THRISSUR DISTRICT, KERALA**

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut and Nationally re-accredited by
NAAC A++ & SAAC A+ grade)

In partial fulfillment of the requirement for the award of the degree of

MASTER OF SCIENCE IN BOTANY

Submitted by

RANJINI C. R.

(Reg. No: CCAVMBT013)

Under the guidance of,

PROF. JACOB ABRAHAM PULIKKAL

Guest lecturer,

Department of Botany,

Christ College (Autonomous), Irinjalakuda



DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS),

IRINJALAKUDA

2021-2023



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CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut & Nationally re-accredited with A++ grade)

CERTIFICATE

This is to certify that the dissertation entitled “**A Preliminary Study on Taxonomic And Medicinal Plants in Pananchery Grama Panchayath, Thrissur District, Kerala**”, submitted by **Miss RANJINI C. R. , Reg. No. CCAVMBTO13**, IV semester M.Sc. Botany in partial fulfillment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bonafide record of the research work carried out by her under the supervision and guidance of **Prof. Jacob Abraham Pulikkal**, Guest lecturer, Department of Botany, Christ College (Autonomous), Irinjalakuda.

Irinjalakuda

Date:

Prof. E. J. Vincent

Coordinator

PG Department of Botany

Signature of Examiners:

1.....

2.....



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CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

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Irinjalakuda

Prof. Jacob Abraham Pulikkal

Date:

Supervising teacher

PG Department of Botany

Christ College (Autonomous)

Irinjalakuda

DECLARATION

I hereby declare that the dissertation work entitled “**A Preliminary Study on Taxonomic And Medicinal Plants in Pananchery Grama Panchayath, Thrissur District, Kerala**”, submitted by **Miss RANJINI C. R., Reg. No. CCAVMBTO13**, IV semester M.Sc. Botany in partial fulfillment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bonafide record of the research work carried out by me under the supervision and guidance of **Prof. Jacob Abraham Pulikkal.**, Guest lecturer, Department of Botany, Christ College (Autonomous), Irinjalakuda.

RANJINI C. R.

ACKNOWLEDGEMENT

I would like to thank Reverend Fr. Dr. Jolly Andrews CMI, Principal, Christ College (Autonomous), Irinjalakuda for giving me the permission and facilities in Botany department of Christ College to complete my dissertation.

I also express my deep sense of gratitude to Prof. Vincent E. J., Coordinator, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda for his valuable ideas and support throughout the course of completing the project.

This work was conducted under the guidance of Prof. Jacob Abraham Pulikkal, Guest lecturer, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda. I am thankful to her, for helping and supporting me and guiding me throughout the period of this work.

I express my immense gratitude to all teachers of Department of Botany, Christ College (Autonomous), Irinjalakuda for their support and encouragement during the course of study.

I also extend my gratitude to Ms. Claudia Mathew for her assistance in the illustration of images.

I utilize this opportunity to express my thanks to Mr. Antony Francis, lab assistant, Department of Botany, Christ College (Autonomous), Irinjalakuda for his support and encouragement.

I thank our mighty God for helping me and giving me the ways for the completion of my work.

I also utilize this opportunity to express my thanks to my dear friends, sister, cousins and relatives for their cooperation, ideas and help rendered throughout this work. Last but not the least, I am indebted to my parents for their help, moral support and encouragement.

RANJINI C. R.

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**COMPARATIVE PHYTOCHEMICAL SCREENING OF *Sansevieria cylindrica*
Bojer Ex Hook AND *sansevieria parva* N.E.Br.**

A Dissertation Submitted to

Christ College (Autonomous), Irinjalakuda,

(Affiliated to the University of Calicut and Nationally re-accredited
by NAAC A⁺⁺ & SAAC A⁺ grade)

In partial fulfilment of the requirement for the award of the degree of

MASTER of SCIENCE in BOTANY

Submitted by,

SANIGA MADHAVAN.S

(Reg No: CCAVMBT014)

Under the Guidance of

MRS. SREELAKSHMI V. V,

Assistant Professor, Department of Botany Christ College

(Autonomous), Irinjalakuda



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2021-2023



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**(Affiliated to University of Calicut & Nationally Re-accredited by NAAC
with 'A⁺⁺' grade)**

CERTIFICATE

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Irinjalakuda

Prof. E. J. Vincent

Coordinator

P. G. Department

of botany

Date:

Examiners:

1.

2.



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CHRIST COLLEGE (AUTONOMOUS) IRINJALAKUDA

(Affiliated to University of Calicut & Nationally Re-accredited by NAAC with
'A⁺⁺' grade)

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Irinjalakuda

Sreelakshmi. V. V

Assistant Professor

P. G. Department of Botany

Date:

DECLARATION

I hereby declare that the dissertation work entitled “**COMPARATIVE PHYTOCHEMICAL SCREENING OF *Sansevieria cylindrica* Bojer Ex Hook. AND *sansevieria parva* N.E.BR.**” Submitted to Christ College (Autonomous), Irinjalakuda, affiliated to the University of Calicut for the partial fulfillment of the requirements for the award of Degree of Master of Science in Botany is a record of original research work done by me under the supervision and guidance of Mrs. Sreelakshmi.V.V, Assistant Professor, Department of Botany, Christ College (Autonomous), Irinjalakuda.

I further declare that the dissertation has not formed on the basis of the award of Degree/Diploma/Fellowship/Associationship or other similar title of any university or institution.

Irinjalakuda

Date:

SANIGA MADHAVAN. S

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At first I would like to show my deepest gratitude to the Almighty God whose unbounded rays of blessings enriched my thoughts and deeps also gave me good health, strength and self- confidence.

I would like to thank Fr. Dr. Jolly Andrews C. M. I., Principal, Christ College (Autonomous), Irinjalakuda, for giving me permission and facilities to complete my dissertation in Christ College (Autonomous), Irinjalakuda, Kerala.

I also express my deep sense of thanks to Prof. E. J. Vincent, Co-ordinator of Department of Botany, Christ College (Autonomous), Irinjalakuda, and who was giving valuable ideas and guidance throughout the course of completing the project.

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Saniga Madhavan. S

PREFACE

The present work entitled with “**COMPARATIVE PHYTOCHEMICAL SCREENING OF *sansevieria cylindrica* Bojer Ex Hook. And *sansevieria parva* N.E. Br**” Was Taken during the period of February – July, 2023 in the partial fulfillment of the requirements prescribed for the M. Sc. Degree in Botany of the University of Calicut. The research work was undertaken on a part time basis during IV semester of the M.Sc. BOTANY Degree course. The time prescribed for the dissertation was 7 hours per week during the IVth semester.

The present work Is an attempt towards updating and recording the “comparative phytochemical screening of *Sansevieria cylindrica* Bojer Ex Hook. And *sansevieria parva* N.E. Br”

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ABSTRACT

In the present study the leaf of plant *S. cylindrica* Bojer ex Hook. And *Sansevieria parva* N.E.Br. is assessed for comparative phytochemical screening. *Sansevieria cylindrica* Bojer Ex Hook. And *sansevieria parva* N.E.Br. belongs to the family asparagaceae. Members of the Asparagaceae family include plants that are used to treat a variety of ailments in traditional medicine. Due to the active phytochemical substances that are responsible for their different pharmacological effects, medicinal plants have been a powerful source of human health. The presence of phytochemicals and their antibacterial properties offer vital insights for the creation of novel drugs to combat severe illnesses. In the present study the leaf of plants *Sansevieria cylindrica* Bojer Ex Hook. And *sansevieria parva* N.E.BR is assessed for comparison and phytochemicals study. The solvents ethanol and acetone used for the extraction of plant material. The extracts were screened for the presence of phytochemical compounds and anatomical study. The results revealed the presence of primary metabolites and the secondary metabolites like phenol, coumarins, tannin, diterpenes, steroids. Ketose show presence in *sansevieria parva* N.E.Br in ethanol extract. Carbohydrate showed positive result in both plants in ethanol extract. Phenol shows presence in both plants and both solvents except. Coumarins and tannin shows presence only in *sansevieria parva* N.E.Br in ethanol extract. Diterpenes and steroids shows positive results in both plants and both extracts.

PHARMACOGNOSTIC PHYTOCHEMICAL AND HPTLC STUDIES OF *Callisia fragrans*(Lindl.) Woodson

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut and Nationally re-accredited
by NACC A⁺⁺ & SAAC A⁺)
In partial fulfilment of the requirement for the award of the degree of

MASTER OF SCIENCE IN BOTANY

Submitted by

SNEHA C.J

Reg. No: CCAVMBT015



Under the guidance of

**Mr. Bijeshmon P. Manager Quality Control
Sitaram Ayurveda (P) Limited, Nedupuzha**

&

Under the co-guidance of

Prof. E.J Vincent,

Co-Ordinator of P.G. Department of Botany
Christ College (Autonomous), Irinjalakuda, Thrissur

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CERTIFICATE

This is to certify the Dissertation entitled “**PHARMACOGONOSTIC, PHYTOCHEMICAL AND HPTLC STUDIES OF *CALLISIA FRAGRANS (LINDL.) WOODSON.***” submitted to the University of Calicut, in the partial fulfilment of the requirements for the award of the degree of **MASTER OF SCIENCE IN BOTANY** is a record of the original research work done by **Mrs. SNEHA C J (Reg. No.: CCAVMBT015)** during the period of February – March 2023 of her study in the **Quality Control Department (approved by Dept. of AYUSH, Govt. of India) at Sitaram Ayurveda Pvt. Ltd., Nedupuzha, Thrissur** under my supervision and guidance and the dissertation has not formed the basis for the award of any Degree/Diploma/ Associateship/ Fellowship or other similar title to any candidate in any university.

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(Affiliated to University of Calicut & Nationally accredited with A++ grade)

CERTIFICATE

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Irinjalakuda

Date:

Prof. E. J. Vincent
Coordinator
P.G. Department of Botany

Signature of Examiners:

1.....

2.....



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Irinjalakuda
Date:

Prof. E.J Vincent
Supervising teacher
P.G. Department of Botany
Christ College
(Autonomous) Irinjalakuda

DECLARATION

I hereby declare that the dissertation work entitled “**Pharmacognostic, Phytochemical and HPTLC studies of Callisia fragrans(Lindl.) Woodson**” submitted by **Ms. SNEHA C.J, Reg. No. CCAVMBTO15**, IV semester M. Sc. Botany in partial fulfilment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bona fide record of the research work carried out by me under the supervision and guidance of **Mr.Bijeshmon P.**, Manger quality control, Sitaram Ayurveda (P) Limited and under the co guidance of **Prof. E.J Vincent** Co-Ordinator of P.G. Department of Botany, Christ College (Autonomous), Irinjalakuda.

SNEHA C.J

ACKNOWLEDGEMENT

I would like to thank Reverend Fr. Dr. Jolly Andrews CMI, Principal, Christ College (Autonomous), Irinjalakuda for giving me the permission and facilities in Botany department of Christ College to complete my dissertation.

I also express my deep sense of gratitude to Prof. Vincent E. J., Coordinator, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda for his valuable ideas and support throughout the course of completing the project.

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This work was conducted under the co guidance of Prof. E.J Vincent, Co-ordinator of P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda. I am thankful to him, for helping and supporting me and guiding me throughout the period of this work.

I express my immense gratitude to all teachers and staff of Department of Botany, Christ College (Autonomous), Irinjalakuda for their support and encouragement during the course of study.

I extent my deepest thanks to my parents for helping me throughout this journey and all the care they showed.

I thank our mighty God for helping me and giving me the ways for the completion of my work.

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SNEHA C.J

PREFACE

The present work entitled with “**Pharmacognostic, Phytochemical and HPTLC studies of Callisia fragrans(Lindl.) Woodson**” was taken during the period of January - March, in the partial fulfilment of the requirement prescribed for the M. Sc Degree in Botany of the University of Calicut. The research work was taken on a part time basis during IVth semester of the M. Sc Degree course, the time prescribed for the dissertation was 7 hours per week during the IVth semester.

The present work is an attempt towards updating and recording the “**Pharmacognostic, Phytochemical and HPTLC studies of Callisia fragrans(Lindl.) Woodson**”.

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ABSTRACT

Callisia fragrans(Lindl.) Woodson is a perennial plant which belongs to Commelinaceae family. It known as basket plant, false bromeliad, inch plant and octopus plant.It is known for its medicinal properties and also for aesthetic value. The present study aimed at morphological, anatomical, phytochemical analysis, powder microscopy, Physico chemical analysis, HPTLC finger print of *Callisia fragrans*. In morphological analysis, anatomy of stem, leaf and root are selected for analysis. In phytochemical investigation, Phytochemical compounds like phenol, flavonoid, alkaloids, sugars, quinine, coumarin, glycoside etc. have been isolated. Powder analysis shows the presence of calcium oxalate crystals, fibers, trichomes, xylem vessels, etc. The HPTLC research will be useful in identifying bioactive chemicals and indicators. *Callisia fragrans* is a mixture of molecules that will provide sufficient information about the therapeutic efficacy of the drug and will also be utilized in the identification, standardization, and quality control.

**COMPARATIVE STUDY OF PHYSIOCHEMICAL, ANTIMICROBIAL
AND PHYTOCHEMICAL ANALYSIS OF LEAF, FRUIT, SEED AND
BARK OF *ZIZIPHUS MAURITIANA LAM.***

Dissertation submitted to

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

(Affiliated to University of Calicut and Nationally re-accredited
by NACC A⁺⁺ & SAAC A⁺)

In partial fulfilment of the requirement for the award of the degree of

MASTER OF SCIENCE IN BOTANY

Submitted by

SURYAPRABHA R

Reg. No: CCAVMBT016



Under the guidance of

**Mr. Bijeshmon P. Manager Quality Control
Sitaram Ayurveda (P) Limited, Nedupuzha**

&

Under the co-guidance of

Ms. Sreelakshmi V.V.
Assistant professor P.G. Department of Botany
Christ College (Autonomous), Irinjalakuda, Thrissur

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DEPARTMENT OF BOTANY

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

**(Affiliated to University of Calicut & Nationally accredited with A++
grade)**

CERTIFICATE

This is to certify that the dissertation entitled “**Comparative study of physiochemical, antimicrobial and phytochemical analysis of leaf, fruit, seed and bark of *Ziziphus mauritiana lam.***” submitted by **Ms. SURYAPRABHA R, Reg. No. CCAVMBT016**, IV semester M. Sc. Botany in partial fulfilment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bona fide record of the research work carried out by her under the supervision and guidance of **Mr. Bijeshmon P.**, Manger quality control, Sitaram Ayurveda (P) Limited and under the co guidance of **Ms. Sreelakshmi V.V.** Assistant professor, P. G. Department of Botany, Christ College (Autonomous), Irinjalakuda.

Irinjalakuda

Date:

PROF. E. J. VINCENT

**Coordinator
P.G Dept. of Botany**

Signature of Examiners:

1.....

2.....



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Irinjalakuda
Date:

SREELAKSHMI V.V.

**Supervising teacher
P.G Dept. of Botany
Christ College (Autonomous),
Irinjalakkuda**

DECLARATION

I hereby declare that the dissertation work entitled “**Comparative study of physiochemical, antimicrobial and phytochemical analysis of leaf, fruit, seed and bark of *Ziziphus mauritiana lam.***” submitted by **Ms. SURYAPRABHA R, Reg. No. CCAVMBTO16.** IV semester M. Sc. Botany in partial fulfilment for the award of degree of **Master of Science in Botany**, Christ College (Autonomous), Irinjalakuda is a bona fide record of the research work carried out by me under the supervision and guidance of **Mr. Bijeshmon P.**, Manager quality control, Sitaram Ayurveda (P) Limited and under the co guidance of **Ms. Sreelakshmi V.V.** assistant professor, P.G. Department of Botany, Christ College (Autonomous), Irinjalakuda.

SURYAPRABHA R

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PREFACE

The present work entitled **“Comparative study of physiochemical, antimicrobial and phytochemical analysis of leaf, fruit, seed and bark of *Ziziphus mauritiana lam.*”** was taken during the period of January - March, in the partial fulfilment of the requirement prescribed for the M. Sc Degree in Botany of the University of Calicut. The research work was taken on a part time basis during IVth semester of the M. Sc Degree course, the time prescribed for the dissertation was 7 hours per week during the IVth semester.

The present work is an attempt towards updating and recording the **“Comparative study of physiochemical, antimicrobial and phytochemical analysis of leaf, fruit, seed and bark of *Ziziphus mauritiana lam.*”**.

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ABSTRACT

Some populations continue to use traditional medicines rather than modern medicines for primary health care. *Ziziphus mauritania* is used to treat various diseases. The general objective of this study was phytochemical analysis, antimicrobial activity and physicochemical analysis of leaf, fruit, seed, bark extracts of *Ziziphus mauritania* Lam. In preliminary phytochemical investigation ethanol and methanol used as solvent. In antimicrobial analysis Acetone, ethanol and methanol used as solvent. In physicochemical analysis Total ash, Acid insoluble Ash, Alcohol soluble extractive water soluble extractives were determined. *Escherichia coli*, *Bacillus* Sp, *Klebsiella* Sp, *Staphylococcus* Sp, *Pseudomonas* Sp, *Proteus* Sp, are the test microorganisms used for the Antimicrobial analysis.