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CERTIFICATE

This is to certify that the thesis entitled **"Beneficial aspects of selective endophytic bacteria isolated from *Morinda* L. species"** is an authentic record of research work carried out by **Mrs. Neenu A Santhosh** under my supervision in fulfilment of the requirement for the degree of Doctor of Philosophy, in Botany of University of Calicut. The results embodied in this thesis have not been included in any other thesis submitted previously for the award of any degree or diploma of any other university or institution. Also certified that the contents of the thesis have been checked using anti-plagiarism data base and no unacceptable similarity was found through the software check.

Thrissur
20 November 2021

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DECLARATION

I, **Neenu A Santhosh**, hereby declare that the thesis entitled **"Beneficial aspects of selective endophytic bacteria isolated from *Morinda* L. species"** submitted to the University of Calicut, for the award of the degree of Doctor of Philosophy in Botany is a bona fide record of the original research work carried out by me under the supervision and guidance of Dr. Anto P V, Assistant professor, Department of Botany, St. Thomas' College (autonomous), Thrissur and that it has not been submitted earlier either in part or full for the award of any degree/diploma to any candidate of any University.

Thrissur

20.11.2021

Neenu A Santhosh

ACKNOWLEDGEMENT

First and foremost, I thank **Lord Almighty**, who showered his abundant blessings upon me which enriched my thoughts, deeds and gave me health, strength and confidence to complete my work successfully.

I wish to express my sincere gratitude to my Research guide **Dr. Anto P.V**, Assistant Professor, Department of Botany, St. Thomas' college, Thrissur, for his unceasing encouragement, strong support, excellent guidance, valuable suggestions, immense support as a result of which I could successfully complete this work.

I am grateful to our Principal, Rev. **Fr. Dr. Martin K.A** and former Principal, **Dr. K.L Joy**, Associate professor, Department of chemistry and **Dr. Ignatius Antony**, Associate professor, Department of Botany, St. Thomas, College (autonomous), Thrissur.

I express my gratitude to former Head and Associate Professor **Dr. C.D Varghese** and Assistant Professor **Dr. Vimala Jose**, Head of the Department of Botany, St. Thomas' college (Autonomous), Thrissur for all the facilities and help rendered for my research work.

I pay my deepest gratitude to **Dr. Sr. Marriette A Therattil**, former Principal and **Dr. Sr. Magie Jose**, Principal, St. Marys college, Thrissur for providing me lab facilities in their esteemed college during the initial stages of my research work.

I am grateful to **Dr. Sr. Meena K Cheruvathur**, Vice- Principal, Assistant Professor; **Dr. Regi Raphael K**, former HOD, Associate Professor; **Dr. Rekha K**, HOD, Assistant Professor; teaching and non-teaching staffs, Department of Botany, St. Marys College, Thrissur for their unconditional support.

I convey my sincere gratitude to Prof. **K.M James** (Late), **Prof. Jacob Abraham Pulikal**, **Prof. Tony Jacob**, **Prof. N.V Joseph,** and all my beloved teachers for their blessings and constant encouragements.

I mention specials thanks to **Dr. Geethu Elizabeth**, **Dr. Joby Paul**, **Dr. Thomas M.T** and **Dr. Sandhya Vincent**, Assistant professors, Department of Botany, St. Thomas College (autonomous), Thrissur for their support and encouragement throughout my research work.

I extend my sincere gratitude to **Dr. Ramdas Kuttan**, former Director, **Dr. Achuthan C Ragavamenon** and **Dr. Babu T D** Scientist, Amala Cancer Research Institute,

Thrissur for providing the facilities and permission for the consultation in their esteemed institution.

I am also thankful to **Mrs. Preetha**, lab Assistant, **Mr. Vaisakh**, Research associate and all research scholars, Amala Cancer Research Institute, Thrissur for their help and timely suggestions during my research work.

I am thankful to **CSIR**, New Delhi for providing me the fellowship to meet the financial assistance for the research.

I convey my heartfelt thanks to **Mr. Sanjo**, Librarian of St. Thomas' college (Autonomous), Thrissur and Librarian of Central Library, KAU, Vellanikkara.

I extend my thanks to the lab assistant **Mr. Joy** and **Mr. Paulson**, Botany Department, St. Thomas' College (autonomous), Thrissur for their co-operation and encouragement during this work.

I mention special thanks to **Dr. Girija**, Head of Department of Microbiology, Vellanikkara, and all project assistants of that department for giving an opportunity to doing a part of my work in their department.

I convey my sincere gratitude to Agrigenome Pvt. Ltd, Kakkanad; STIC CUSAT, Cochin; KVASU, mannuthy and **Mrs. Beena** Omicsgen, Kakkanad, for providing lab facilities.

I extend my deep sense of gratitude to **Dr. Shahina P.M**, **Dr. Surekha** and **Dr. Anusree Dharman** for their immense help, assistance and suggestions during the final stages of my research.

My profound sense of gratitude is extended to the research colleagues in my lab, **Mrs. Seena**, **Mrs. Alina**, **Ms. Nimmy**, **Mrs. Keerthana**, **Mrs. Afsana**, **Mrs. Dhanya**, **Mrs. Reshma**, **Mrs. Smitha**, **Ms. Aiswariya**, **Mrs. Rameena**, **Mrs. Hridhya**, **Mrs. Lakshmi**, **Mrs. Sreeshma**, **Mrs. Aparna**, **Mrs. Blessy**, **Ms. Reshma Rajan**, **Mr. Shaibu** and **Mr. Jithin** for rendering their valuable suggestions and endless support and motivation.

I also thank all teachers and research colleagues of various departments for the support and help.

I am much indebted for the encouragement and immense support of all my family members, especially my mother **Jancy**, father **Santhosh**, brother **Nikhil**, mother-in-law **Thankamma**, my husband **George** and two lovely sons, **Gan** and **Gene**.

Neenu A Santhosh

Dedicated to my lovely family

PREFACE

In nature, no eukaryotes exist without prokaryotes. All the living organisms carry prokaryotes in them for their survival and existence. Endophytic bacteria residing inside the living tissue causing no harm to the host plays a major role in controlling the host's physiology and metabolism. They show symbiotic association with the plant they reside and consume the metabolites from the host for their growth. They also secrete such consumed compounds as secondary metabolites, characteristic of the host's active compounds. Therefore, if the host plants have good medicinal property, the endophytes in it may possess the similar character of the host.

Endophytic microorganisms have an inexhaustible source of chemical compounds and can biosynthesize a wide variety of beneficial secondary metabolites. They are the depot of novel drugs with various biological activities of pharmaceutical importance. Research on the endophytes reports that they utilize the chemical compound of the host for their metabolism and secrete it as extracellular metabolites. In vice versa, these endophytes are symbiotically related to the growth and development of the host plant. The search of these potent endophytic bacteria from the medicinally important plant led to the present study of isolation of such bacteria from the plant *Morinda* L. species. Also, the work has showcased the pharmacological activities of the endophytic bacteria.

The study suggest that the isolated endophytic bacterial species have important antimicrobial, antioxidant, anti-inflammatory, and anticancer activities. Also, the study focused on the use of the bacterial sample in nanoparticle production. The differences in the biological activities among the isolates can be due to the varied bioactive compounds present in it.

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ABBREVIATIONS

° C	Degree Celsius
µL	Microliter
µg	Microgram
mL	Milliliter
mg	Milligram
mM	Millimolar
M	Molar
Kg	Kilogram
g	Gram
v/v	Volume per volume
w/v	Weight per volume
b.wt.	Body weight
bp	Base pair
cm	Centimeter
nm	Nanometer
A°	Angstrom
min	Minute
sec	Second
h	Hour
%	Percentage
∼	Approximately
rpm	Revolutions per minute
kV	Kilovolt
mA	Milliampere
pH	Potential of Hydrogen
IC	Inhibitory concentration
θ	Theta
λ	Lambda
α	Alpha
β	Beta
γ	Gamma
O D	Optical density
Cu	Copper
W	Watt
Cos	Cosine
Sin	Sine
CO_2	Carbon dioxide
MCF-7	Michigan Cancer Foundation-7
RPMI	Roswell Park Memorial Institute
SOD	Superoxide dismutase