LICHEN DIVERSITY OF ULTAPANI FOREST RANGE, MANAS BIOSPHERE RESERVE, ASSAM AND BIOLOGICAL ACTIVITY OF SELECTED SPECIES

A THESIS SUBMITTED TO

THE DEPARTMENT OF BOTANY, BODOLAND UNIVERSITY

FOR THE AWARD OF

DEGREE OF DOCTOR OF PHILOSOPHY IN BOTANY

UNDER

FACULTY OF SCIENCE AND TECHNOLOGY

SUBMITTED BY

PUNGBILI ISLARY

ENROLLMENT NO.: BOTPHD-02

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CERTIFICATE

I am pleased to forward this Ph.D. thesis entitled **"LICHEN DIVERSITY OF ULTAPANI FOREST RANGE, MANAS BIOSPHERE RESERVE, ASSAM AND BIOLOGICAL ACTIVITY OF SELECTED SPECIES"** by Ms. Pungbili Islary, submitted for the award of the Degree of Doctor of Philosophy (Ph.D.) in Botany in the Faculty of Science and Technology.

Ms. Pungbili Islary has carried out this work under my supervision and fulfils all the requirements under the Ph.D. Regulations of Bodoland University. She has been registered under Bodoland University with Provisional Registration No. PROV.BOT00235 of 2019-2020 and Ph.D. Final Registration No. FINAL.BOT00235 of 2019-2020.

I further declare that the thesis is entirely original and her own investigation and no part of the thesis have been submitted to any other university or anywhere for the award of any degree.

Daimari 27/05/2024

Signature

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DECLARATION

I, Pungbili Islary, declare that the thesis entitled **"LICHEN DIVERSITY OF ULTAPANI FOREST RANGE, MANAS BIOSPHERE RESERVE, ASSAM AND BIOLOGICAL ACTIVITY OF SELECTED SPECIES"** is a bonafide Ph.D. work done by me under the supervision of Dr. Rebecca Daimari, Assistant Professor, Department of Botany, Bodoland University. This thesis is submitted to Bodoland University for the award of degree, Doctor of Philosophy (Ph.D.) at Bodoland University bearing Enrollment no. BOTPHD-02 and final Registration no. FINAL.BOT00235 of 2019-2020. The thesis is the result of my own investigation and is original, and has not been previously submitted for the award of any degree or other research works.

Pungbili Islary

Place: Kokrajhar

Dated: May, 2024

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I bowed down to the All-Mighty God, whose favours made it possible for me to finish my research work.

Pungbili Islary

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Abbreviation used

ABTS = 2,2'-Azino-bis-(3-ethylbenzothiazoline-6-sulfonic acid)

AO = Acridine Orange

BUBH = Bodoland University Botanical Herbarium

CFU = Colony forming unit

Coll. = Collector

CRF = Chirang Reserve Forest

CSIR = Council of Scientific and Industrial Research

Diam. = Diameter

DMSO = Dimethyl sulphoxide

DPPH = 1-diphenyl-2,2-picrylhydrazil

DW = Dry weight

Elev. = Elevation

EtBr = Ethidium bromide

FBS = Fetal Bovine Serum

FRAP = Ferric-reducing antioxidant power assay

G = Gram

GA = Gyrophoric acid

GAE = Gallic acid equivalent

GAW = Glycerine-alcohol-water

GE = Glycerine-acetic acid

GPS = Global positioning system

H = Hour

IC50 = Concentration of sample providing 50% inhibition

M = Meter

MBC = Minimum bactericidal concentration

MDR = Multidrug resistance

MFC = Minimum fungicidal concentration

MHA = Muller-Hinton agar

MIC = Minimum inhibitory concentration

Min = Minutes

Ml = Milliliter

Mm = Millimeter

NB = Nutrient broth

NCCLS = National Commitee for Clinical Laboratory Standards

NIST = National Institute Standard and Technology

PBS = Phosphate buffered saline

Rf = Retention factor

SDA = Sabourard dextrose agar

SIRS = Systemic Inflammatory Response Syndrome

TLC = Thin Layer Chromatography

TTC = 2,3,5-triphenyl tetrazolium chloride

UFR = Ultapani Forest Range

UNESCO = The United Nations Educational, Scientific and Cultural Organization

US = United State

UV = Ultra violet

WHO = World health organization

YPD = Yeast Peptone Dextrose

ZOI = Zone of inhibition

µl = Microlitre

µm = Micrometer