

*I dedicate the Ph.D thesis in memory  
of my beloved*

*Maa: Late Rumi Hazarika Neog and*

*Deuta: Bhabendra Nath Neog*

## ***DECLARATION***

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I hereby declare that the thesis entitled “*Asiatic fresh water mud eel (Monopterus albus) gut derived microbial enzyme, its molecular assessment and industrial application*” has been submitted to Tezpur University in the Department of Molecular Biology and Biotechnology under the School of Sciences for partial fulfilment for the award of the degree of Doctor of Philosophy in Molecular Biology and Biotechnology. This is an original work carried out by me. Further, I declare that no part of this work has been reproduced elsewhere for award of any other degree.

**Date:** 05-02-2024

**Place:** Tezpur University



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(A Central University established by an Act of Parliament)

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## CERTIFICATE OF THE SUPERVISOR

This is to certify that the thesis entitled “*Asiatic fresh water mud eel (Monopterusuchia) gut derived microbial enzyme, its molecular assessment and industrial application*” submitted to the School of Sciences, Tezpur University in partial fulfilment for the award of the degree of Doctor of Philosophy in Molecular Biology and Biotechnology is a record of original work carried out by **Miss. Panchi Rani Neog** under my personal supervision and guidance.

All helps received by her from various sources have been duly acknowledged. No part of this thesis has been reproduced elsewhere for award of any other degree.

**Date:** 05-02-2024

**Place:** Tezpur University

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## ABBREVIATIONS

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Abbreviations	Name
3D	Three dimensional
µg	Microgram
µl	Microlitre
µM	Micromolar
%	Percentage
v/v	volume by volume
°C	Degree centigrade
BSA	Bovine serum albumin
BLAST	Basic local alignment search tool
bp	Base pair
CFS	Cell free supernatant
CaCl <sub>2</sub>	Calcium chloride
CuSO <sub>4</sub>	Copper Sulfate
DNA	Deoxyribonucleic acid
DTT	Dithiothreitol
DFP	Diisopropylfluorophosphates
EDTA	Ethylene diamine tetra acetic acid
FeSO <sub>4</sub>	Ferrous sulfate
g/L	Gram per litre
H	Hour
Hb	Hemoglobin
HgCl <sub>2</sub>	Mercuric chloride
H <sub>2</sub> O <sub>2</sub>	Hydrogen peroxide
IDT	Integrated DNA Technologies
IPTG	Isopropyl β- d-1-thiogalactopyranoside
I-TASSER	Iterative Threading ASSEmblY Refinement
kb	Kilobase
KDa	kilodalton
KH <sub>2</sub> PO <sub>4</sub>	Potassium dihydrogen phosphate
L	Litre
LB	Luria-Bertani Broth



LOMETS	Local Meta-Threading Server
mg/mL	Milligrams per millilitre
M	Molar
Min	Minute
mL	Millilitre
mM	Millimolar
mm	Millimeter
MCV	Mean cell volume
MCH	Mean cell hemoglobin
MCHC	Mean cell hemoglobin concentration
MEGA	Molecular evolutionary genetics analysis
MTCC	Microbial Type Culture Collection
MgSO <sub>4</sub>	Magnesium sulfate
MnSO <sub>4</sub>	Manganese sulfate
NB	Nutrient broth
NCBI	National Centre for Biotechnology Information
NaOH	Sodium hydroxide
NaH <sub>2</sub> PO <sub>4</sub>	Sodium phosphate monobasic
Na <sub>2</sub> HPO <sub>4</sub> ·7H <sub>2</sub> O	di-Sodium hydrogen phosphate heptahydrate
NaCl	Sodium chloride
Ni-NTA	Nickel-Nitrilotriacetic acid
NH <sub>4</sub> Cl	Ammonium chloride
Nm	Nanometer
OD	Optical density
PCR	Polymerase chain reaction
PAGE	Polyacrylamide gel electrophoresis
PCV	Packed cell volume
PDB	Protein Data Bank
PMSF	Phenyl methane sulfonyl fluoride
PPI	Protein-protein interaction
Rpm	Rotation per minute
RP-HPLC	Reverse phase high performance liquid chromatography
RAPD	Random amplified polymorphic DNA

RBC	Red blood cells
RFLP	Restriction fragment length polymorphism
RT	Retention time
SDS	Sodium dodecyl sulphate
SDF	Structure data file
Tris-HCl	Tris (hydroxymethyl) aminomethane
TSB	Tryptone soya broth
UV-VIS	Ultraviolet-visible spectroscopy
ZnSO <sub>4</sub>	Zinc sulfate