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I, **Km. Renu Chaudhary**, declare that the thesis entitled **"Enhancement of iron and zinc bioavailability in finger millet (*Eleusine coracana*) using bacterial endophytes"** is my own work conducted under the supervision of **Dr. Vivek Kumar** (Supervisor) at **Swami Rama Himalayan University**, Himalayan School of Biosciences approved by D.R.C.

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This is to certify that **Km. Renu Chaudhary** in the department of **Biosciences** of this University has fulfilled the requirements prescribed for the Ph.D. degree of the Swami Rama Himalayan University, Dehradun.

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"ENHANCEMENT OF IRON AND ZINC BIOAVAILABILITY IN FINGER MILLET (*Eleusine Coracana*) USING BACTERIAL ENDOPHYTES"

Thesis Submitted In Partial Fulfillment of
The Award of Degree of
Doctor of Philosophy
In The Faculty of Microbiology

SUBMITTED BY
KM. RENU CHAUDHARY

SUPERVISOR
DR. VIVEK KUMAR

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LIST OF ABBREVIATIONS

%	Percent
ACCD	1-aminocyclopropane-1-carboxylate deaminase
ATCC	American type culture collection
BLAST	Basic Local Alignment Search Tool
BPB	Bromophenol blue
℃	Degree Celsius
CAS	Chrome azurol S
CAS-HDTMA	Chrome azurol S- Hexadecyltrimethylammonium bromide
CFU	Colony forming unit
DNA	Deoxyribose Nucleic Acid
dNTP	deoxy Nucleotide Triphosphate
DTPA	Diethylenetriaminepentaacetic acid
DW	Distilled water
e^-	Electron
ETC	Electron transport chain
FAO	Food and Agriculture Organization
Fe	Iron
FM	Finger millet
g	Gram
GI	glycemic index
HDTMA	Hexadecyltrimethylammonium bromide
His	Histidine
HPLC	High performance liquid chromatography
hr	hour
Ile	Isoleucine
K cal	Kilocalorie
L	Litre
LAF	Laminar airflow
LB	Luria-Bertani
Leu	Leucine
Lys	Lysine

M	Molar
M	Molar
MEGA	Molecular Evolutionary and Genetic Analysis
Met	Methionine
mg	Milligram
Min	Minutes
mL	Millilitre
mm	Millimetre
mM	Millimolar
MTCC	Microbial type Culture Collection
N	Normal
NA	Nutrient agar
NaClO	Sodium hypochlorite
NB	Nutrient broth
NBRI-BPB	National Botanical Research Institute-bromophenol blue
NCBI	National Centre for Biotechnology and Information
nm	Nanometre
PCR	Polymerase Chain Reaction
Phe	Phenylalanine
RDF	Recommended dose of fertilization
rDNA	ribosomal Deoxyribose nucleic Acid
ROS	Reactive oxygen species
rpm	Revolution per minute
s	Second
SD	Standard deviation
SI	Solubilization index
sp.	Species
T	Type
Thr	Threonine
UNEP	United Nations Environment Programme
UV	Ultraviolet
v/v	Volume/volume
Val	Valine

vit	Vitamin
Zn	Zinc
ZSB	Zinc solubilizing bacteria
µg	Microgram
µl	Microlitre