

VISVA – BHARATI

FOUNDED BY

ACHARYA
MR. NARENDRA D. MODI

RABINDRANATH TAGORE

P.O SRINIKETAN -731 236
WEST BENGAL, INDIA

Ph : 03465-264787

Fax : (91)03463-261156

Rly.Station :BOLPUR

UPACHARYA
PROF. SWAPAN KUMAR DATTA



PALLI SIKSHA BHAVANA

(Institute of Agriculture)

DEPARTMENT OF SOIL SCIENCE & AGRICULTURAL CHEMISTRY

From :

Dr. Goutam Kumar Ghosh

Professor

Department of Soil Science & Agricultural Chemistry

Palli Siksha Bhavana (Institute of Agriculture)

Dr. A.K.Pal

Professor & Former Head

Department of Soil Science &

Agricultural Chemistry, OUAT,

Bhubaneswar

CERTIFICATE

This is to certify that the work recorded in the thesis entitled “**RESPONSE TO ZINC BY MAIZE BASED CROPPING SYSTEM IN ALFISOLS OF ODISHA**” submitted in partial fulfillment for the degree of **Doctor of Philosophy in Agriculture (Soil Science and Agricultural Chemistry)** to Visva-Bharati is a record of *bona-fide* research carried out by **Mrs. Lata Malik, Regd. No.VB- 1700 of 2012-13** under our joint guidance and supervision. No part of the thesis has been submitted for any other Degree or Diploma or published in any other form. The assistance and help received during the course of investigation have been duly acknowledged.



(Asit Kumar Pal)
CO-SUPERVISOR

(Goutam Kumar Ghosh)
SUPERVISOR

**APPROVAL OF EXAMINERS FOR THE AWARD OF THE DEGREE
OF DOCTOR OF PHILOSOPHY IN AGRICULTURE
(SOIL SCIENCE AND AGRICULTURAL CHEMISTRY)**

We, the undersigned, having been satisfied with the performance of Mrs.Lata Malik,
Regd. No.VB- 1700 of 2011-12 in the Viva-Voce examination conducted today, the..... of
..... , 2017, recommended that the Thesis entitled **“RESPONSE TO ZINC BY
MAIZE BASED CROPPING SYSTEM IN ALFISOLS OF ODISHA ”** be accepted
for the award of the degree of Doctor of Philosophy in Agriculture (Soil Science and
Agricultural Chemistry) from Visva-Bharati.

Approved by

Signature

1. Prof.(Dr.) Goutam Kumar Ghosh
(*Supervisor*)

2. Prof.(Dr.) Asit Kumar Pal
(*Co-Supervisor*)

3. External Examiner

Acknowledgment

*I wish to express my heartiest and deepest sense of gratitude, indebtedness and sincere thanks to my Supervisor, **Prof. Gautam Kumar Ghosh**, Professor, Department of Soil science & Agricultural Chemistry, Palli Siksha Bhavana, Visva-Bharati, Sriniketan for his meticulous supervision, scholastic guidance, sustained inspiration, valuable advice and encouragement throughout the course of investigation and preparation of this manuscript.*

*I extend my sincere regards and heartiest gratitude to my Co-Supervisor, **Prof. Asit Kumar Pal**, Professor & Former Head (Soil Science and Agricultural Chemistry), Odisha University of Agriculture and Technology, Bhubaneswar for his valuable suggestions and constant guidance during the entire course of investigation.*

*I would like to convey my sincere regards and pronounced gratitude to Prof. Sarthak Chowdhury, **Principal**, Palli Siksha Bhavana and Prof. A.K.Chatterjee, Head and faculty members of Department of Soil science & Agricultural Chemistry, Palli Siksha Bhavana, Visva Bharati, Sriniketan for their support, cooperation and encouragement throughout the course of my study.*

I express my sincere thanks to Prof. S.R.Mitra, Dr. Suchhanda Mondal, Dr. P.K.Biswas, Dr. Y.V.Rao and Dr. M.C.Kundu of Department of Soil Science and Agricultural Chemistry, PSB, Institute of Agriculture for their constant help and critical suggestions during the course of my thesis work.

*I owe indebtedness to **Prof. Susant Kumar Pattanaik**, Head, Dr.K.K. Rout, Dr.R.K.Patra, Professor, Dr.AMishra and Dr.R.K.Nayak, Associate Professor, Deptt. of Agricultural Chemistry and Soil Science, OUAT, Bhubaneswar, for extending their generous help and able guidance throughout the ups and downs during my research work.*

*I express my delighted thanks to Dr.Nirakar Ranasingh, Associate Professor, Dr. Rajeeb Maharana, Assistant Professor, College of Agriculture, Bhanipatna, Kalahandi, **Tulasi Madam, Nihar babu and Dilip babu** for their inspiration and support during the course of investigation.*

*I would like to pay my Zenith regards and foremost devotions to my **Beloved Parents (Mrs Uma Malik and Shri late Jadu Malik)**, for their incipient blessings and inspiration that has actually helped me in shaping my career and brought me to this stage of success.*

*I express my profound love and affection to **my son Bishal,my husband,Shanti Nani, Sumi Nani, Subhadra Nani,Niranjana Bhaina, Kuna,Amul,Badal and others** who worked untiringly to make the work as perfect as possible and their catalytic role in every step of my life which inspire me to be patience and constructive during the course of investigation.*

*Last but not the least; I am thankful to **Maa Baisnu Devi** whose blessing made it possible to complete my doctorate programme within the stipulated time.*

Sriniketan
Date:

(Lata Malik)
Ph.D. Scholar