

DECLARATION

I hereby declare that the thesis entitled “**Biochar to mitigate GHGs emission from acidic sandy loam soils of Assam: Role of feedstock and production technique**” being submitted to the Department of Environmental Science, School of Sciences, Tezpur University in partial fulfillment for the award of the degree of Doctor of Philosophy is a record of original research work carried out by me under the supervision of **Dr. Nirmali Gogoi**, and Co-supervision of **Prof. Debendra Chandra Baruah**, Department of Environmental Science, Tezpur University.

I also declare that neither this work as a whole nor a part of it has been submitted to any other university or institute for award of any other degree or diploma.

All helps received during thesis writing from various sources have been duly acknowledged.



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All help received by her from various sources have been duly acknowledged.

No part of this thesis has been submitted elsewhere for award of any other degree.

Place: Tezpur, Assam

Date: 07/03/2024

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CERTIFICATE OF EXTERNAL EXAMINER

This is to certify that the thesis entitled “**Biochar to mitigate GHGs emission from acidic sandy loam soils of Assam: Role of feedstock and production technique**” submitted to the School of Sciences, Tezpur University in partial fulfillment for the award of the degree of Doctor of Philosophy in Environmental Science is a record of research work carried out by **Ms. Juri Chetia** has been examined by us on 23rd April, 2024 and found to be satisfactory.

The committee recommends her for the award of the degree of Doctor of Philosophy.

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LIST OF ABBREVIATIONS

Abbreviation	Full form
AC	Adsorption capacity
AEI	Amendment effect index
ANOVA	Analysis of variance
BD	Bulk density
C	Control
CEC	Cation exchange capacity
CEE	Carbon equivalent emission
CFU	Colony forming unit
CSP	Carbon sequestration potential
CV	Calorific value
DAS	Days after sowing
DMRT	Duncan's multiple range test
EC	Electrical conductivity
ECD	Electron capture detector
EPA	Environmental Protection Agency
FAC	Fulvic acid carbon
FC	Fixed carbon
FTIR	Fourier transform infrared spectroscopy
FYM	Farmyard manure
GCMS	Gas chromatography mass spectrophotometry
GHG	Greenhouse gas
GI	Germination index
GWP	Global warming potential
ha	Hectares
HAC	Humic acid carbon
LC	Labile carbon
LSD	Least significance difference
MBC	Microbial biomass carbon
MC	Moisture content
NPK	Nitrogen, phosphorus and potassium

PCA	Principal component analysis
PIG	Percent inhibition germination
SA	Specific Surface area
SAIC	Sophisticated analytical instrumentation centre
SEM	Scanning electron microscope
SOC	Soil organic carbon
T	Temperature
t	Ton
TGA	Thermo-gravimetric analyser
TL	Tea pruning litter
TLC	Tea pruning litter conventional
TLG	Tea pruning litter gasification
TLP	Tea pruning litter pyrolysis
VI	Vigor index
VM	Volatile matter
WC	Mixed wood chips
WCC	Mixed wood chips conventional
WCG	Mixed wood chips gasification
WCP	Mixed wood chips pyrolysis
WHC	Water holding capacity
WHC	Water holding capacity
