

Dedicated
to
my parents and in-laws

DECLARATION

I hereby declare that the thesis entitled **“Cold Plasma Pre-treatment and Foam Mat Drying of Pineapple Pulp: Enzyme Inactivation, Interrelating Pulp Rheology with Powder Attributes and Sorption Isotherm”** is being submitted to the **School of Engineering, Tezpur University, Tezpur, Assam** in partial fulfilment of the requirements for the award of the degree of **Doctor of Philosophy** in the **Department of Food Engineering and Technology** is a record of research work accomplished by me under the supervision of **Prof. Brijesh Srivastava**.

All helps from various sources haven been duly acknowledged.

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

Date: 27.10.2025

Place: Tezpur


(Arjuara Begum)

Registration No. TZ168173 of 2016



तेजपुर विश्वविद्यालय/ TEZPUR UNIVERSITY
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(Awardee of Visitor's Best University Award, 2016 and 5th among India's Top 100 Universities, MHRD-NIRF Ranking, 2016)

Dr. Brijesh Srivastava
Professor
Department of Food Engineering and Technology

Mobile: +91-7635804240
Phone: 0303712-275712
Email: brijesh@tezu.ernet.in

CERTIFICATE OF THE SUPERVISOR

This is to certify that the thesis entitled **“Cold Plasma Pre-treatment and Foam Mat Drying of Pineapple Pulp: Enzyme Inactivation, Interrelating Pulp Rheology with Powder Attributes and Sorption Isotherm”** submitted to the **School of Engineering, Tezpur University** in partial fulfilment of the requirements for the award of the degree of **Doctor of Philosophy** in the **Department of Food Engineering and Technology** is a record of original research work carried out by **Ms. Arjuara Begum** under my supervision and guidance.

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

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

Date: 27.10.2025

Place: Tezpur

(Brijesh Srivastava)

Supervisor

ACKNOWLEDGEMENT

I wish to express my deepest gratitude to my supervisor, Prof. Brijesh Srivastava, Department of Food Engineering and Technology, School of Engineering, Tezpur University, Assam, for his exceptional guidance, encouragement, and expertise. His insightful suggestions, patient support, and dedicated involvement from the inception of this research to the successful completion of my thesis have been invaluable.

I am equally grateful to my esteemed doctoral committee members, Dr. M. K. Hazarika, Dr. Nandan Sit (Department of Food Engineering and Technology), Dr. Dilip Dutta (Department of Mechanical Engineering), and Dr. Dambarudhar Mohanta (Department of Physics), Tezpur University, for their constructive feedback and thoughtful guidance throughout the course of my research.

My sincere thanks are also due to Prof. Nandan Sit, Prof. Laxmikant S. Badwaik, former Heads, and Prof. Poonam Mishra, Head of the Department of Food Engineering and Technology, for their essential research resources, continual support, and valuable advice during my Ph.D.

I extend my heartfelt appreciation to all the faculty members of the Department of Food Engineering and Technology for their valuable input and constant encouragement.

I am deeply thankful to Prof. Shambhu Nath Singh, Vice-Chancellor of Tezpur University, for fostering a conducive academic environment and ensuring the availability of facilities that enabled the smooth progress of my doctoral work.

I also gratefully acknowledge the assistance of the technical and non-technical staff of the department for their unfailing cooperation and support.

I sincerely acknowledge the financial assistance provided by the National Agricultural Science Fund (NASF), the Indian Council of Agricultural Research (ICAR), Government of India, and Tezpur University, which was instrumental in carrying out this research.

On a personal note, I am profoundly indebted to my parents, in-laws, family members, and my husband for their unwavering support, unconditional love, and constant encouragement throughout this challenging journey. Their faith in me has been my greatest source of strength and motivation.

Above all, I bow in humble gratitude to the Almighty Allah for His infinite mercy, guidance, and blessings, without which this achievement would not have been possible. Alhamdulillah, all praise is due to Him alone

Arjuana Begum
Arjuara Begum

Date: 27.10.2025

Place: Tezpur

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LIST OF ABBREVIATIONS

Abbreviations	Full form
CP	Cold plasma
ACP	Atmospheric cold plasma
DBD	Dielectric barrier discharge
PPO	polyphenoloxidase
POD	peroxidase
PME	Pectin Methyl esterase
CMC	Carboxymethyl cellulose
EU	European Union
SMP	Skimmed milk powder
PVPP	Polyvinyl polypyrrolidone
WT	Whipping time
SSP	Sorenson's phosphate
EV	Expansion volume
FD	Foam density
FS	Foam stability
DV	Drainage volume
MR	Moisture ratio
CI	Carr index
HR	Hausner ratio
WSI	Water solubility index
WAI	Water absorption index
PCA	Partial component analysis
RSM	Response surface methodology
DPPH	2,2-diphenyl-1-picrylhydrazyl
FCR	Folin-Cocteau reagent
PME	Pectin methylesterase
RA	Residual activity
TSS	Total soluble solids
TA	Titrateable acidity

TPC	Total phenolic content
SD	Standard deviation
RMSE	Root means square error
AIC	Akaike information criterion
GAE	Gallic acid equivalent
EC	Electrical conductivity
SPSS	Statistical Package for Social Sciences
ANOVA	Analysis of variance

LIST OF SYMBOLS

Symbols	Full form
mg	Milligram
g	Gram
kV	Kilovolt
mm	Millimeter
mL	Milliliter
%	Percentage
°C	Degree Celsius
σ^2	Variance
μm	Micrometer
β	Shape factor
δ	Scale factor
min	Minute
s	Second
U	Unit
A_f	Accuracy factor
B_f	Bias factor
°B	Degree brix
ΔE	Total colour difference
R^2	Coefficient of determination
cm	Centimeter
ε	Porosity
ρ_d	Particle density
ρ_b	Bulk density
G'	Storage modulus
G''	Loss modulus
σ	Maximum stress
σ_e	Equilibrium stress
η^*	Complex viscosity
δ	Phase angle
σ_0	Yield stress
ω	Frequency
σ_{max}	Maximum stress