

DECLARATION

The candidate certifies that the thesis entitled “**Development of plant-based meat analogues from Manila tamarind (*Pithecellobium dulce*) seeds**” submitted to the *School of Engineering, Tezpur University* in partial fulfilment for the award of the degree of *Doctor of Philosophy* in the *Department of Food Engineering and Technology* is a record of research work carried out by me under the supervision of **Prof. Nandan Sit**.

All assistance received from various sources has been appropriately acknowledged.

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

Date: 13-11-2025

Place: Tezpur University



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Certificate of the Supervisor

This is to certify that the thesis entitled “**Development of plant-based meat analogues from Manila tamarind (*Pithecellobium dulce*) seeds**” submitted to the **School of Engineering**, Tezpur University in part fulfillment for the award of the degree of Doctor of Philosophy in **Food Engineering and Technology** is a record of research work carried out by **Mr. Awanish Singh** 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 other degree.

Date: 13-11-2025

(**Prof. Nandan Sit**)

Place: Tezpur University

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LIST OF ABBREVIATIONS

ΔE	Colour difference
3-MCPD	3-monochloropropane-1,2-diol
a^*	Red-green chromaticity
AA	Amino Acids
AAS	Amino Acid Score
AC	Autoclave
ANOVA	Analysis of Variance
AOAC	Association of Official Analytical Chemists
b^*	Yellow-blue chromaticity
BV	Biological Value
CLSM	Confocal Laser Scanning Microscopy
CPF	Chicken-like processed flavour
Cryo-SEM	Cryogenic Scanning Electron Microscopy
DH	Degree of hydrolysis
DMA	Dynamic Mechanical Analysis
DMSO	Dimethyl Sulfoxide
DPPH	2,2-Diphenyl-1-picrylhydrazyl
DSC	Differential Scanning Calorimetry
DT	Degree of Texturization
DW	Distilled water
EA	Emulsifying activity
EAA	Essential Amino Acids
EAAI	Essential Amino Acid Index
ES	Emulsifying stability
F_L	Parallel cutting force
F_V	Vertical cutting force
FTIR	Fourier-Transform Infrared Spectroscopy
GCMS	Gas Chromatography Mass Spectrometry
HEK-293	Human Embryonic Kidney cell line
HMMA	High moisture meat analogues
HPLC	High-Performance Liquid Chromatography
IVPD	<i>In-vitro</i> Protein Digestibility

IVPDCAAS	<i>In-vitro</i> Protein Digestibility Corrected Amino Acid Score
JFF	Jackfruit flour
L	Liquid fraction
<i>L</i> *	Lightness
LCMS	Liquid Chromatography Mass Spectrometry
LGC	Least Gelation Concentration
MC	Moisture Content
MTGase	Microbial Transglutaminase
MTSF	Manila tamarind seed flour
MTSPI	Manila tamarind seed protein isolate
MTT	Dimethylthiazol-diphenyltetrazolium-bromide
MW	Microwave
NEAA	Non-essential amino acids
OAC	Oil absorption capacity
OHC	Oil holding capacity
PBMA	Plant-Based Meat Analogues
PBS	Phosphate Buffered Saline
PI	Protein Isolate
PS	Protein solubility
RSM	Response surface methodology
S	Salt
SA	Sodium Alginate
SDS-PAGE	Sodium Dodecyl Sulfate Polyacrylamide Gel Electrophoresis
SEM	Scanning electron microscopy
SPH	Seed protein hydrolysates
TPA	Texture profile analysis
TSP	Texturized Soy Protein
TVP	Texturized Vegetable Protein
US	Ultrasound
US30	Ultrasound for 30 min
WAC	Water Absorption Capacity
WG	Wheat Gluten
WHC	Water holding capacity