



Dedicated to
My Beloved Parents
Smt. Renu Bala
&
Sh. Rajbir Singla

Declaration by the Candidate

The thesis entitled “**Utilization of ripe papaya peels for extraction of valuable components and their applications in food processing**” is being submitted to **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 bonafide research work accomplished by me under the supervision of **Prof. Nandan Sit**.

All helps from various sources have been duly acknowledged.

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

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Certificate of the Supervisor

This is to certify that the thesis entitled “**Utilization of ripe papaya peels for extraction of valuable components and their applications in food processing**” submitted to the **School of Engineering, Tezpur University** in partial fulfilment 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. Mohit Singla** 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.

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List of Tables

Table No.	Title	Page No.
2.1	Nutritional value in papaya fruits, seeds, and leaf (mg/100 g)	11
2.2	Bioactive compounds of papaya peel and their activities	13
3.1	A overview of the experimental conditions for several methods of extraction	51
3.2	Proximate chemical composition of papaya peel	55
3.3	Mineral compositions of papaya peel	56
3.4	Parameters of the Second order (k) and Langmuir (K_L) models for total phenolic content	58
3.5	Parameters of the Second order (k) and Langmuir (K_L) models for total flavonoid content	59
3.6	Parameters of the Second order (k) and Langmuir (K_L) models for antioxidant activity	59
3.7	Effect of ultrasound on extraction of total phenolic content	74
3.8	Effect of ultrasound on extraction of total flavonoid content	75
3.9	Effect of ultrasound on extraction of antioxidant activity	75
3.10	HPLC analysis of papaya peel extract	77
4.1	Effect of PEG 6000 and ammonium sulphate salt on partitioning of papain enzyme	91
4.2	Effect of PEG 6000 and sodium sulphate salt on partitioning of papain enzyme	92
5.1	Physiochemical properties of watermelon juice	109
5.2	Physiochemical properties of spray dried powder	111
5.3	Color measurement of spray dried powder	112
5.4	Phytochemical properties of enriched powder	115
6.1	Different concentration of papain for the tenderization of cut chicken and mutton meat	125
6.2	Texture profile of treated cut chicken meat	128
6.3	Texture profile of treated cut mutton meat	129
6.4	Texture profile of cooked cut chicken meat	132
6.5	Texture profile of cooked cut mutton meat	133

List of Figures

Table No.	Title	Page No.
2.1	(a) Papaya tree (b) Papaya fruit (c) Fresh cut papaya fruit	9
2.2	Schematic diagram of ATPS	22
3.1	Effect of different pretreatment in different solvents on total phenolic content (a) Water (b) Ethanol (c) Water:Ethanol (1:1)	63
3.2	Effect of different pretreatment in different solvents on total flavonoid content (a) Water (b) Ethanol (c) Water:Ethanol (1:1)	64
3.3	Effect of different pretreatment in different solvents on total antioxidant activity (a) Water (b) Ethanol (c) Water:Ethanol (1:1)	65
3.4	Effect of different solvents in different pretreatments on total phenolic content (a) Enzyme (b) Microwave (c) Microwave-Enzyme (d) Enzyme-Microwave	68
3.5	Effect of different solvents in different pretreatments on total flavonoid content(a) Enzyme (b) Microwave (c) Microwave-Enzyme (d) Enzyme-Microwave	69
3.6	Effect of different solvents in different pretreatments on antioxidant activity(a) Enzyme (b) Microwave (c) Microwave-Enzyme (d) Enzyme-Microwave	70
3.7	Effect of ultrasound on total phenolic content	72
3.8	Effect of ultrasound on total flavonoid content	73
3.9	Effect of ultrasound on antioxidant activity	73
3.10	HPLC analysis of papaya peel phenolic extract	77
4.1	SDS-PAGE patterns of cysteine protease from papaya peel partitioned	96
4.2	GPC analysis of extracted papain	97
5.1	Overview methodology of the experiment work	104
5.2	Total phenolic content of enriched spray dried powder	116
5.3	Antioxidant activity of enriched spray dried powder	116

5.4	Reconstituted enriched spray dried powder	117
5.5	Sensory analysis of enriched spray dried powder	117
6.1	Texture profile of papain treated cut chicken meat	130
6.2	Texture profile of papain treated cut mutton meat	131
6.3	Texture profile of cooked chicken meat	134
6.4	Texture profile of cooked mutton meat	135
6.5	Sensory evaluation of cooked chicken meat	137
6.5	Sensory evaluation of cooked mutton meat	137

List of Abbreviation

$(\text{NH}_4)_2\text{SO}_4$	Ammonium Sulphate
μM	Micromoles
A_B	Protease activity in bottom phase
ANOVA	Analysis Of Variance
APTS	Aqueous Two-Phase System
A_T	Protease activity in top phase
BITC	Benzyl Isothiocyanate
BSA	Bovine Serum Albumin
C_e	Phenolic compound equilibrium concentration in the liquid extract (g/L)
C_t	Phenolic concentration in the liquid extract at a certain extraction time (t)
DPPH	2,2-diphenyl-1-picrylhydrazyl-radical scavenging activity
EAE	Enzyme-Assisted Extraction
E-Et	Enzyme-Ethanol
EM-Et	Enzyme-Microwave
EM-W	Enzyme/Microwave
EM-WEt	Enzyme-Microwave
E-W	Enzyme-Water
E-WEt	Enzyme-Water/Ethanol
FPP	Freeze-dried phytochemical compounds extracted from papaya peel
GAE	Gallic acid equivalents
HPLC	High-Performance Liquid Chromatography
k	Second-order reaction rate constant (L/g min)
K_e	Partition coefficient of enzyme
K_L	Langmuir model rate constant
K_p	Partition coefficient of protein
MAE	Microwave-Assisted Extraction

MD	Maltodextrin
ME-Et	Microwave/Enzyme-Ethanol
M-Et	Microwave-Ethanol
ME-W	Microwave/Enzyme-Water
ME-WEt	Microwave/Enzyme-Water/Ethanol
MT	Million Metric Tonnes
M-W	Microwave-Water
M-WEt	Microwave-Water/Ethanol
Na ₂ SO ₄	Sodium Sulphate
PEG	Polyethylene glycol
PF	Purification factor
pI	Isoelectric point
ppm	Parts per million
R ²	Coefficient of determination
RME	Reverse Micellar Extraction
RMSE	Root mean square error
SDS-PAGE	Sodium dodecyl-sulfate polyacrylamide gel electrophoresis
SWP	Spray-dried watermelon juice
TCA	Trichloroacetic Acid
TFC	Total Flavonoid Content
TMP	Thermo-Separation
TPC	Total Phenolic Content
TPP	Three-Phase Partitioning
TSS	Total Soluble Solids
U	Total activity of protease
UAE	Ultrasound-Assisted Extraction
UAEE	Ultrasound-Assisted Enzymatic Extraction

UMAE	Ultrasound-Assisted Microwave Extraction
VR	Volume Ratio
Y(%)	Yield
Y _f	Yield at infinite time
