

## **DECLARATION**

I, hereby declare that this thesis entitled “**THERMAL AND NON-THERMAL EXTRACTION AND PASTEURIZATION OF RED DRAGON FRUIT JUICE**” is a bonafide record of research works done by me during the course of research and the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title, of any other University or Society.

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**Date:**

**NITHYA C**

**(2020-28-003)**

## **CERTIFICATE**

Certified that this thesis entitled “**THERMAL AND NON-THERMAL EXTRACTION AND PASTEURIZATION OF RED DRAGON FRUIT JUICE**” is a bonafide record of research work done independently by **Er. NITHYA C (2020-28-003)** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, fellowship or associateship to her.

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**Dedicated to the farmers  
and all curious souls  
whose passion for food  
and agriculture drives innovation and  
discovery**

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## SYMBOLS AND ABBREVIATIONS

%	Percentage
<	Less than
=	Equal to
°C	Degree Celsius
¢	Cent
×	Multiplication sign
+	Plus
±	Plus or minus
μ	Micro
μg	Microgram
μg/L	Microgram per litre
μs	Micro second
a*	Greenness or redness
b*	Blueness or yellowness
L*	Darkness or lightness
A	Ampere
AC	Alternating current
ANOVA	Analysis of variance
AOAC	Association of Official Analytical Chemists
BCE	Betacyanin equivalent
CFU	Colony Forming Unit
CO <sub>2</sub>	Carbon dioxide
cm	Centimeter
CV	Coefficient of variation
df	Degrees of freedom
<i>E. coli</i>	<i>Escherichia coli</i>
<i>et al.</i>	And others
etc.	et cetera
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration



FRDFD	Fermented red dragon fruit drink
FSSAI	Food Safety and Standards Authority of India
FTIR	Fourier Transform Infrared
g	Gram
GAE	Gallic acid equivalents
h	Hours
HACCP	Hazard Analysis Critical Control Point
HHP	High hydrostatic Pressure
HIPEF	High Intensity Pulsed Electric Field
HMF	Hydroxymethylfurfural
HP	High pressure
HPEF	High pulsed electric field
HPP	High Pressure Processing
HTST	High temperature short time
i.e.	That is
JEVA	Juice evaporation
KAU	Kerala Agricultural University
KCAEFT	Kelappaji College of Agricultural Engineering & Food Technology
kg	Kilogram
kHz	Kilo hertz
kV	Kilo volts
kW	Kilo watts
L	Litre
m	Metre
min	Minutes
mL	Milli litre
mm	Milli metre
mg/L	Milli gram per litre
mPas	Milli pascal second
MAE	Microwave Assisted Extraction
MPa	Mega Pascal
MRE	Meals ready to eat
NIR	Near infrared

NO	Nitric oxide
PEF	Pulsed electric field
PL	Pulsed light
PME	Pectin methyl esterase
POD	Peroxidase
PPO	Polyphenol oxidase
ppb	Parts per billion
ppm	Parts per million
QE	Quercetin equivalents
R&D	Research and development
RDFD	Red dragon fruit drink
RDFJ	Red dragon fruit juice
RMSE	Root mean square error
RSM	Response Surface Methodology
s	Seconds
TFC	Total Flavonoid content
TP	Thermal pasteurization
TPC	Total phenolic content
TS	Thermosonication
TSS	Total Soluble Solids
UAM	Ultrasound assisted maceration
UAE	Ultrasound Assisted Extraction
US	Ultrasound
UV-Vis	Ultraviolet-visible
V	Volt
VRTP	Variable retort temperature processing
W/g	Watt per gram
Zp	Cell disintegration index

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