DECLARATION

I, hereby declare that this thesis entitled **"**REFRACTANCE WINDOW DRYING AND INSTANTANEOUS CONTROLLED PRESSURE DROP ASSISTED EXTRACTION OF ESSENTIAL OIL FROM NUTMEG MACE**"** is a bonafide record of research work done by me during the course of research. 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.

Tavanur
Date:

Ann Annie Shaju
(2022-28-001)

CERTIFICATE

Certified that this thesis entitled "REFRACTANCE WINDOW DRYING AND INSTANTANEOUS CONTROLLED PRESSURE DROP ASSISTED EXTRACTION OF ESSENTIAL OIL FROM NUTMEG MACE" is a record of research work done independently by Ann Annie Shaju (2022-28-001) 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.

Tavanur

Date:

Dr. Prince M V
(Major Advisor, Advisory Committee)
Professor and Head,
Department of PFE
KCAEFT, Tavanur

CERTIFICATE

We, the undersigned members of the advisory committee of **Er. Ann Annie Shaju (2022-28-001)**, a candidate for the degree of **Doctor of Philosophy in Agricultural Engineering** with major in Processing and Food Engineering, agree that the thesis entitled "REFRACTANCE WINDOW DRYING AND INSTANTANEOUS CONTROLLED PRESSURE DROP ASSISTED EXTRACTION OF ESSENTIAL OIL FROM NUTMEG MACE" may be submitted by Er. Ann Annie Shaju (2022-28-001), in partial fulfillment of the requirement for the degree.

Dr. Prince M.V.
(Major Advisor, Advisory Committee)
Professor and Head
Department of PFE
KCAEFT, Tavanur

Dr. Sudheer K.P.
(Member, Advisory Committee)
Professor and Head
Department of Agricultural Engg.
College of Agriculture, Vellanikkara

Dr. Rajesh G.K.
(Member, Advisory Committee)
Associate Professor
Department of PFE
KCAEFT, Tavanur

Dr. Lilia Baby
(Member, Advisory Committee)
Assistant Professor (Community Science)
Krishi Vigyan Kendra
Malappuram

Mr. Vaisakh Venu
(Member, Advisory Committee)
Assistant Professor
Department of BEAS
KCAEFT, Tavanur

EXTERNAL EXAMINER
Dr. M.S. Sajeev
Principal Scientist (AS&PE)
Division of Crop Utilisation
ICAR – CTCRI
Trivandrum

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Ann Annie Shaju

DEDICATION

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SYMBOLS AND ABBREVIATIONS

A	:	Area
a	:	Constant used in drying equation
a_w	:	Water activity
Cp	:	Specific heat capacity
D_{eff}	:	Effective moisture diffusivity
K	:	Thermal conductivity / drying rate constant
M	:	Moisture content
M_0	:	Initial moisture content
M_e	:	Equilibrium moisture content
M_t	:	Moisture content at time t
MR	:	Moisture ratio
P	:	Pressure
Q	:	Heat energy transferred
R	:	Universal gas constant
R^2	:	Coefficient of determination
RH	:	Relative humidity
r	:	Radius
T	:	Temperature
t	:	Time
U	:	Overall heat transfer coefficient
v	:	Velocity
V	:	Volume
W	:	Weight / Mass
X	:	Independent variable
Y	:	Response variable
μ	:	Mean / Dynamic viscosity

ρ	:	Density
λ	:	Wavelength / Latent heat
Σ	:	Standard deviation
Δ	:	Difference / Change in value
∇	:	Gradient
°C	:	Degree Celsius
K	:	Kelvin
rpm	:	Revolutions per minute
min	:	Minute
h	:	Hour
s	:	Second
kg	:	Kilogram
g	:	Gram
mg	:	Milligram
µg	:	Microgram
L	:	Litre
mL	:	Millilitre
µL	:	Microlitre
Pa	:	Pascal
kPa	:	Kilopascal
MPa	:	Megapascal
N	:	Newton
W	:	Watt
kW	:	Kilowatt
J	:	Joule
kJ	:	Kilojoule
mol	:	Mole
%	:	Percent
ppm	:	Parts per million
ppb	:	Parts per billion
DR	:	Drying rate
DE	:	Drying efficiency

SEC	:	Specific energy consumption
TPC	:	Total phenolic content
TFC	:	Total flavonoid content
AA	:	Antioxidant activity
RWD	:	Refractance Window Drying
HAD	:	Hot Air Drying
SD	:	Sun Drying
CE	:	Conventional Hydrodistillation
MAHD	:	Microwave assisted Hydrodistillation
ICPD	:	Instantaneous Controlled Pressure Drop
SEM	:	Scanning Electron Microscopy
DSC	:	Differential Scanning Calorimetry
FTIR	:	Fourier Transform Infrared Spectroscopy
GCMS	:	Gas Chromatography–Mass Spectrometry