DECLARATION

I hereby declare that the Ph. D. thesis entitled “PROPERTIES AND PROSPECTS OF R–PHYCOERYTHRIN FROM PORTIERIA HORNEMANNII (LYNGBYE) SILVA” submitted to the University of Madras under the Supervision of Prof. R. RENGASAMY, Director, Centre for Advanced Studies in Botany and the thesis has not formed previously the basis for the award of any degree, diploma, associateship, titles in this or any other University or other similar institution of Higher learning.

(N. SENTHILKUMAR)

Countersigned by

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Dedicated to My Family
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<td>°C</td>
<td>degree Celsius</td>
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<tr>
<td>2–DE</td>
<td>2-Dimensional Gel Electrophoresis</td>
</tr>
<tr>
<td>A549</td>
<td>Aadenocarcinomic human alveolar basal epithelial cell lines</td>
</tr>
<tr>
<td>AFM</td>
<td>Atomic Force Microscopy</td>
</tr>
<tr>
<td>AgNO₃</td>
<td>Silver nitrate</td>
</tr>
<tr>
<td>ALT</td>
<td>Alanine transaminase</td>
</tr>
<tr>
<td>ANOVA</td>
<td>ANALYSIS OF VARIANCE</td>
</tr>
<tr>
<td>AO</td>
<td>Acridine Orange</td>
</tr>
<tr>
<td>APC</td>
<td>Allophycocyanin</td>
</tr>
<tr>
<td>AST</td>
<td>Aspartate transaminase</td>
</tr>
<tr>
<td>B–PE</td>
<td>Bangiales Phycoerythrin</td>
</tr>
<tr>
<td>BSA</td>
<td>Bovine Serum Albumin</td>
</tr>
<tr>
<td>CaCl₂</td>
<td>Calcium chloride</td>
</tr>
<tr>
<td>CAT</td>
<td>Catalase</td>
</tr>
<tr>
<td>CBB</td>
<td>Coomassie Brilliant Blue</td>
</tr>
<tr>
<td>CD</td>
<td>Circular Dichroism</td>
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<tr>
<td>Chl. a</td>
<td>Chlorophyll a</td>
</tr>
<tr>
<td>Chl. d</td>
<td>Chlorophyll d</td>
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<tr>
<td>cm</td>
<td>centi metre</td>
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<tr>
<td>CoCl₂</td>
<td>Cobalt chloride</td>
</tr>
<tr>
<td>CO₂</td>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>COX2</td>
<td>Cyclooxygenase 2</td>
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<tr>
<td>C– PE</td>
<td>Cyanophycean Phycoerythin</td>
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</table>
CuSO₄ – Copper sulphate
Da – Dalton
DAM – Diacetyl monoxime
DEAE-Cellulose – Diethylaminoethyl cellulose
DEN – DiethylNitrosamine
dL – deci Litre
DMSO – Dimethyl sulfoxide
DNA – Deoxyribo Nucleic Acid
DNPH – 2,4-dinitrophenylhydrazine
DPPH – 2,2-diphenyl-1-picrylhydrazyl
DSC – Differential Scanning Calorimetry
DTNB – 5,5′-dithiobis-(2-nitrobenzoic acid)
DTT – Dithiothreitol
DXR – Doxorubicin
EB – Ethidium Bromide
EDTA – Ethylene diamine tetraacetic acid
EEZ – Exclusive Economic Zone
ELISA – Enzyme Linked Immuno Sorbent Assay
EM – Electron Microscopy
EPR – Electron Paramagnetic Resonance Spectroscopy
FACS – Fluorescence Activated Cell Sorting
FAO – Food and Agriculture Organization
FT–IR – Fourier Transform – Infrared Spectroscopy
FT – Raman – Fourier Transform – Raman Spectroscopy
g – gram
G₀ Phase – Gap 0 Phase
G₁ Phase – Gap 1 Phase
G₂ Phase – Gap 2 Phase
GPx – Glutathione Peroxidase
GR – Glutathione Reductase
GSH – Reduced Glutathione
GSSG – Glutathione disulfide
H₂O₂ – Hydrogen peroxide
H₂SO₄ – Sulphuric acid
Hb – Haemoglobin
HB100 – Human Breast cells
HCC – Hepato Cellular Carcinoma
HCl – Hydrochloric acid
HDL – High Density Lipoprotein
HepG2 – Human hepatocellular carcinoma cell line
HgCl₂ – Mercuric chloride
HPLC – High Performance Liquid Chromatography
h – Hour
IAEC – Institutional Animal Ethics Committee
IC₅₀ – Inhibitory Concentration by 50%
IDA – Iodoacetamide
IgE – Immunoglobulin E
IU – International Unit of Proteins
kDa – kilo Dalton
km – kilo metres
KOH – Potassium Hydroxide
L – Litre
Lat. N’ – Latitude North
LDH – Lactate dehydrogenase
LDL – Low Density Lipoprotein
Long. E’ – Longitude East
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<td>LPO</td>
<td>Lipid peroxidation</td>
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<tr>
<td>LSD</td>
<td>Least Significant Difference</td>
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<tr>
<td>m</td>
<td>metre</td>
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<tr>
<td>M</td>
<td>Molar</td>
</tr>
<tr>
<td>M</td>
<td>Phase – Mitotic Phase</td>
</tr>
<tr>
<td>mL</td>
<td>milli Litre</td>
</tr>
<tr>
<td>mM</td>
<td>milli Molar</td>
</tr>
<tr>
<td>mA</td>
<td>micro Ampere</td>
</tr>
<tr>
<td>MALDI – TOF</td>
<td>Matrix Assisted Laser Desorption and Ionization – Time Of Flight</td>
</tr>
<tr>
<td>MASCOT</td>
<td>Matrix Science</td>
</tr>
<tr>
<td>mg</td>
<td>milligram</td>
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<tr>
<td>MgSO4</td>
<td>Manganese sulphate</td>
</tr>
<tr>
<td>min.</td>
<td>minute</td>
</tr>
<tr>
<td>mm</td>
<td>milli metre</td>
</tr>
<tr>
<td>MnCl2</td>
<td>Manganese chloride</td>
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<tr>
<td>MOPS</td>
<td>3-(N-morpholino) propane sulfonic acid</td>
</tr>
<tr>
<td>MTT</td>
<td>3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide</td>
</tr>
<tr>
<td>MWCO</td>
<td>Molecular Weight Cut Off</td>
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<tr>
<td>N-Terminal</td>
<td>Amino terminal</td>
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<tr>
<td>NaCl</td>
<td>Sodium chloride</td>
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<td>NaOH</td>
<td>Sodium hydroxide</td>
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<td>Na2CO3</td>
<td>Sodium carbonate</td>
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<td>Na2S2O3</td>
<td>Sodium Thio Sulphate</td>
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<tr>
<td>NADH</td>
<td>Reduced Nicotinamide adenine dinucleotide</td>
</tr>
<tr>
<td>NADPH</td>
<td>Reduced Nicotinamide adenine dinucleotide phosphate</td>
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<td>NATIVE –PAGE</td>
<td>Non –denaturing Poly Acrylamide Gel Electrophoresis</td>
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<tr>
<td>NCBI</td>
<td>National Centre for Biotechnology Information</td>
</tr>
<tr>
<td>NCCS</td>
<td>National Centre for Cell Sciences</td>
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<tr>
<td>NH₄HCO₃</td>
<td>Ammonium bicarbonate</td>
</tr>
<tr>
<td>nm</td>
<td>nanometer</td>
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<tr>
<td>OD</td>
<td>Optical Density</td>
</tr>
<tr>
<td>PBP’s</td>
<td>Phycobiliprotein’s</td>
</tr>
<tr>
<td>PBS</td>
<td>Phosphate Buffered Saline</td>
</tr>
<tr>
<td>PE</td>
<td>Phycoerythrin</td>
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<tr>
<td>PEG</td>
<td>Poly Ethylene Glycol</td>
</tr>
<tr>
<td>ppm</td>
<td>parts per million</td>
</tr>
<tr>
<td>psi</td>
<td>pound-force per square inch</td>
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<tr>
<td>RBC</td>
<td>Red Blood Corpuscles</td>
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<tr>
<td>RBL-2H3 Cell line</td>
<td>Rat basophilic leukemia</td>
</tr>
<tr>
<td>Rm</td>
<td>Relative mobility</td>
</tr>
<tr>
<td>RNase</td>
<td>Ribonuclease</td>
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<tr>
<td>ROS</td>
<td>Reactive Oxygen Species</td>
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<tr>
<td>R-PE</td>
<td>Rhodophycean - Phycoerythrin</td>
</tr>
<tr>
<td>rpm</td>
<td>revolution per minute</td>
</tr>
<tr>
<td>RT</td>
<td>Room temperature</td>
</tr>
<tr>
<td>Rt</td>
<td>Retention time</td>
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<td>SDS</td>
<td>Sodium Dodecyl Sulphate</td>
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<td>SDS-PAGE</td>
<td>Sodium Dodecyl Sulphate - Poly Acrylamide Gel Electrophoresis</td>
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<td>sec.</td>
<td>Second</td>
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<tr>
<td>SEM</td>
<td>Scanning Electron Microscopy</td>
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<tr>
<td>SGOT</td>
<td>Serum Glutamate Oxaloacetate Transaminase</td>
</tr>
<tr>
<td>SGPT</td>
<td>Serum Glutamate Pyruvate Transaminase</td>
</tr>
<tr>
<td>SOD</td>
<td>Super Oxide Dismutase</td>
</tr>
<tr>
<td>SPM</td>
<td>Scanning Probe Microscopy</td>
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<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>SPSS</td>
<td>Statistical Product and Service Solutions (previously Statistical Package for Social Sciences)</td>
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<tr>
<td>TBA</td>
<td>Thiobarbituric acid</td>
</tr>
<tr>
<td>TCA</td>
<td>Trichloroacetic acid</td>
</tr>
<tr>
<td>TEM</td>
<td>Transmission Electron Microscopy</td>
</tr>
<tr>
<td>TEMED</td>
<td>Tetra methyl ethylene diamine</td>
</tr>
<tr>
<td>TFA</td>
<td>Trifluoroacetic acid</td>
</tr>
<tr>
<td>TGA</td>
<td>Thermal Gravimetric Analysis</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>UV – Visible</td>
<td>Ultra Violet – Visible Spectrophotometer</td>
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<tr>
<td>v/v</td>
<td>volume by volume</td>
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<tr>
<td>VLDL</td>
<td>Very Large Density Lipoprotein</td>
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<tr>
<td>w/v</td>
<td>weight by volume</td>
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<tr>
<td>WBC</td>
<td>White Blood Corpuscles</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<tr>
<td>wt.</td>
<td>weight</td>
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<tr>
<td>μg</td>
<td>microgram</td>
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<tr>
<td>μm</td>
<td>micrometre</td>
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<td>Total protein content of selected red seaweeds</td>
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<td>Total lipid content of selected red seaweeds</td>
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<td>Chl. a content of selected red seaweeds</td>
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<td>Chl. d content of selected red seaweeds</td>
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<td>17.</td>
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<td>Effect of different concentrations of Cobalt chloride on activity of R–Phycoerythrin of <em>Portieria hornemannii</em></td>
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65. A549 control cells

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68. HepG2 control cells

69. HepG2 cancer cells treated with R–PE 700 (µg/mL) of *Portiera hornemannii* after 48 h

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71. Cell cycle status of A549 cells treated with R–PE 750 (µg/mL) of *Portiera hornemannii* after 48 h

72. Cell cycle status of HepG2 control cells after 48 h

73. Cell cycle status of HepG2 cells treated with R–PE 700 (µg/mL) of *Portiera hornemannii* after 48 h

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78. Histopathology of liver cells of R–PE treated animals at 400 X
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<td>Peptide mass fingerprinting analysis of α₂ subunit of R–Phycoerythrin using Swiss–Prot</td>
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<tr>
<td>6.</td>
<td>Peptide mass fingerprinting analysis of β₁ subunit of R–Phycoerythrin using Swiss–Prot</td>
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<td>7.</td>
<td>Peptide mass fingerprinting analysis of β₂ subunit of R–Phycoerythrin using Swiss–Prot</td>
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<td>Peptide mass fingerprinting analysis of γ subunit of R–Phycoerythrin using Swiss–Prot</td>
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<td>Quantification of lipid profile of liver homogenate</td>
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<tr>
<td>14.</td>
<td>Quantification of enzymatic antioxidants of liver homogenate</td>
</tr>
<tr>
<td>15.</td>
<td>Quantification of non–enzymatic antioxidants of liver homogenate</td>
</tr>
<tr>
<td>16.</td>
<td>Quantification of lipid peroxidation of liver homogenate</td>
</tr>
</tbody>
</table>