


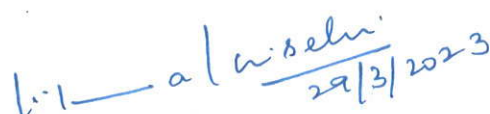
CERTIFICATE

I certify that the thesis entitled "**A study on Neuroprotective potential of *in vitro* and field tissues of *Withania somnifera* using *Caenorhabditis elegans* model**" submitted for the award of **Doctor of Philosophy (Ph.D)** by **KRISHNAPRIYA.C** is the record of research work carried out by her during the period from **August 2017** to **March 2023** under my guidance and supervision, and that this work has not formed the basis for the award of any Degree, Diploma, Associateship, Fellowship or other titles in this Institute or any other University or Institution of Higher Learning.


29/3/2023

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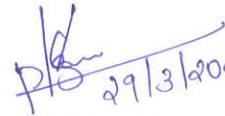

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DECLARATION

I declare that the thesis entitled "**A study on Neuroprotective potential of *in vitro* and field tissues of *Withania somnifera* using *Caenorhabditis elegans* model**" submitted by me for the award of Doctor of Philosophy (Ph.D.) is the record of work carried out by me during the period from 2017 to 2023 under the guidance of **Dr. Kalaiselvi Senthil, Associate Professor, Department of Biochemistry, Biotechnology and Bioinformatics, Avinashilingam Institute of Home Science and Higher Education For Women** and has not formed the basis for the award of any Degree, Diploma, Associateship, Fellowship, Titles in this Institute or any other University or other similar institution of Higher Learning.


29/3/2023

Signature of the Research Scholar


29/3/2023

Signature of the Supervisor

ACKNOWLEDGEMENT

*First and foremost, I owe my profound gratitude to **God Almighty** for the constant strength and blessings showered upon me to take up this research and complete successfully.*

*I express my sincere thanks to Late. **Dr. P. R. Krishnakumar**, former Chancellor and revered Chancellor, **Dr. S. P. Thyagarajan**, **Dr. T. S. K. Meenakshi Sundaram**, Managing Trustee, **Dr. (Mrs.) Premavathy Vijayan**, former Vice Chancellor and **Dr. V. Bharathi Harishankar**, Vice chancellor and **Dr. (Mrs.) S. Kowsalya**, Registrar, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore for all their good wishes and infrastructure rendered during the period of the study.*

*I am really thankful to **Dr. G.P. Jeyanthi**, former Director, Research & Consultancy, former Professor, Department of Biochemistry, Biotechnology and Bioinformatics and **Dr. (Mrs.) Lalitha**, Dean (i/c), Research and Consultancy, Avinashilingam Institute for Home Science and Higher Education for Women, for her valuable and prudent suggestions during the tenure of the study.*

*My heartfelt thanks to Late. **Dr. P. R. Padma**, former Dean, School of Biosciences, former Professor and Head, Department of Biochemistry, Biotechnology and Bioinformatics for her moral support and constant rational counselling during every step of the research work. My sincere thanks to **Dr. A. Vijayalakshmi**, Dean, School of Biosciences, Professor and Head, Department of Botany for her support in executing the scheduled work. I also thank **Dr. S. Annapurani**, former Professor and Head, Department of Biochemistry, Biotechnology and Bioinformatics, and **Dr. Anitha Subash**, Professor and Head, Department of Biochemistry, Biotechnology and Bioinformatics for their timely commendations and consents.*

*I extend my profound and earnest gratitude to my Supervisor **Dr. Kalaiselvi Senthil**, Associate Professor, Department of Biochemistry, Biotechnology and Bioinformatics, for her meticulous guidance and effective management in execution of each part of the research study. Her enduring efforts and advice were golden pointers for me without which I would not have learnt to be successful in accomplishing a research strategy. Her incessant encouragement, moral support and constant rational*

counselling during every step of the research work will always remind me of our memorable research journey.

*My profound thanks to my Doctoral Committee member, **Dr. N. Geetha**, Professor, Department of Botany, Bharathiar University, Coimbatore, for his guidance, co-operation and judgment during each stage of the research work and review meetings. I would also like to thank all the faculty members, Department of Biochemistry, Biotechnology and Bioinformatics, for their help and suggestions rendered during the study. I am greatly indebted to all my fellow researchers, **Sngeetha U, Kanimozhi. N, Aparnapreethi. R and Swathika. R. S** for the loving friendship and support given throughout my period of study.*

On a personal note, I dedicate this thesis to my beloved parents, parents- in -law, loving husband and my daughter, whose motivation, sacrifice, trust and untiring patience were the strong pillars that pulled me out of the shadows and supported me to complete this work with determination. I acknowledge the contribution of all the other unseen hands during the course of the study for the help rendered in the successful completion of the study.

Thank you all very much !!!

Krishnapriya. C

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LIST OF ABBREVIATIONS

| | |
|-----------------|---|
| ADMET | Absorption, Distribution, Metabolism, Excretion and Toxicity |
| AD | Alzheimer's disease |
| ALL | Acute lymphoblastic leukemia |
| AFI | Ayurvedic Formulary of India |
| AMDIS | Automated Mass spectral deconvolution and Identification system |
| ANOVA | One-way analysis of variance |
| API | Ayurvedic Pharmacopoeia of India |
| BAP | 6-Benzylaminopurine |
| BBB | Blood brain barrier |
| Bax | BCI ₂ associated X protein |
| BSTFA | <i>N,N</i> -Dimethylsilyl trifluoroacetamide |
| CA | Cetrimide agar |
| Cdc37 | Chaperone- cochaperone complex |
| CE | Catechin equivalents |
| CF | Caffeine equivalents |
| CFU | Colony forming unit/gram |
| CHOL | Cholesterol equivalents |
| CNS | Central nervous system |
| Cox-2 | cyclooxygenase -2 |
| DAergic neurons | Dopaminergic neurons |
| DMAPR | Directorate of Medicinal and Aromatic Plants Research |
| DR | Dietary restriction pathway |
| DMSO | Dimethyl sulfoxide |
| DNA | Deoxy ribonucleic acid |
| DPPH | 2,2-diphenylpicrylhydrazyl |
| DW | Dry weight |
| EAE | European Agency for Evaluation |
| FDA | Food and Drug Administration |
| FPP | Farnesyl diphosphate |
| FRSA | Free Radical Scavenging Activity |

| | |
|---------------------------------|--|
| FS | Field grown shoot |
| FR | Field grown root |
| GAE | Gallic acid equivalents |
| GC-MS | Gas Chromatography- Mass Spectrometry |
| GI | Growth index |
| GMP | Good Manufacturing Practices |
| GFP | Green Flurescent Protein |
| HD | Huntington's disease |
| HNO ₃ | Nitric acid |
| HPLC | High Performance Liquid Chromatography |
| HPLC-DAD | High Performance Liquid Chromatography – Diode Array Reduction |
| HPTLC | High Pressure Thin Layer Chromatography |
| HSP 90 | Heat shock protein 90 |
| HPV | Human papillomavirus |
| HUVECs | Human umbilical vein endothelial cells |
| IAA | Indole-3-acetic acid |
| IBA | Indole-3-butyric acid |
| IS | <i>In vitro</i> shoots |
| IR | In vitro roots |
| ICAR | Indian Council of Agricultural Research |
| ICP-MS | Inductively coupled plasma mass spectrometry |
| ICAR | International Organization for Standardization |
| IIS | Insulin/insulin-like growth factor- |
| IGF-1 | Insulin-like growth factor 1 |
| IIP | Isopentenyl phosphate |
| JNK | c-Jun N-terminal kinase pathway |
| KEGG | Kyoto Encyclopedia of genes and Genomes |
| KH ₂ PO ₄ | Potassium Phosphate |
| K ₂ HPO ₄ | Dipotassium phosphate |
| LB- Broth | Luria-Bertani Broth |
| p38 MAPK | Mitogen activated protein kinase |
| mETC | Mitochondrial electron transport chain complexes |
| MS | Murashige and Skoog medium |

| | |
|---------|--|
| MSTFA | N-methyl N-trimethyl silyl trifluoroacetamide |
| MSA | Mannitol salt agar |
| MVA | Mevalonate |
| MEP | Methylerythritol phosphate |
| NCBI | National Center for Biotechnology Information |
| NCCS | National Center for Cell Science |
| NF-B | Nuclear factor kappa B |
| NIST | National Institute of Science and Technology |
| NMPB | National Medicinal Plant board |
| NGM | Nematode growth media |
| iNOS | Nitric oxide synthase |
| NA | Nutrient agar |
| MSA | Mannitol salt agar |
| MS | Murashige and Skoog |
| 6-OHDA | 6-hydroxydopamine |
| PCA | Principal Component Analysis |
| PD | Parkinson's disease |
| PDA | Potato Dextrose agar |
| PTR1 | Pteridine reductase 1 |
| RAFT | Reversible Addition Fragmentation chain Transfer |
| Rf | Retention factor |
| RNA | Ribonucleic acid |
| rpm | Revolutions per minute |
| RP-HPLC | Reverse phase high performance liquid chromatography |
| SAR | The Structure Activity Relationship |
| SD | Standard deviation |
| SOD | Superoxide dismutase |
| TAC | Total Alkaloid Content |
| TF | Transcription Factors |
| TFC | Total Flavonoid content |
| TLC | Thin Layer Chromatography |
| TMCS | trimethyl chlorosilane |
| TBC | Total Bacterial count |

| | |
|-----|------------------------------|
| TSC | Total Phytosterol content |
| USP | United States Pharmacopeias |
| UPS | Ubiquitin-proteasome pathway |
| VDs | Volume of distribution |
| vvm | Vessel volumes per minute |
| WA | Withanolide A |
| WFA | Withaferin A |
| WHO | World Health Organisation |
| WTN | Withanone |
| YFP | Yellow fluorescent protein |