Antioxidant and Antitumorigenic efficacy of methanolic extracts of *Gloriosa superba* and Silver Nanoparticles of methanolic extracts of *Gloriosa superba* to DLA tumor cells

By

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Certificate

This is to certify that the thesis entitled "**Antioxidant and Antitumorigenic efficacy of methanolic extracts of *Gloriosa superba* and Silver Nanoparticles of methanolic extracts of *Gloriosa superba* to DLA tumor cells**", submitted to Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for the award of the Degree of **Doctor of Philosophy in Biochemistry**, is a record of original research work done by **Saradha Devi, K.M.** during the period of her study in the Department of Biochemistry, Biotechnology and Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, under my supervision and guidance and the thesis has not formed the basis for the award of any Degree / Diploma / Associateship / Fellowship or similar title to any candidate of any other University or Institute.

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Declaration

I hereby declare that the matter embodied in the thesis entitled "**Antioxidant and Antitumorigenic efficacy of methanolic extracts of *Gloriosa superba* and Silver Nanoparticles of methanolic extracts of *Gloriosa superba* to DLA tumor cells**", is the result of investigations carried out by me in the Department of Biochemistry, Biotechnology and Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, under the supervision and guidance of **Dr. Tmt. S. Annapoorani,** Professor, Department of Biochemistry, Biotechnology and Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore and it has not been submitted for the award of any Degree / Diploma / Associateship / Fellowship of any other University or Institute.

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List of Abbreviations

$^{\cdot}O_{2}^{-}$	Superoxide anion
µm	micrometer
ACA	1'-(*S*)-1'-Acetoxy Chavicol Acetate
ADP	Adenosine diphosphate
Ag	Silver
AgMGsL	Silver nanoparticles of methanolic extract of *Gloriosa superba* leaves
AgMGsS	Silver nanoparticles of methanolic extract of *Gloriosa superba* seed
AgMGsT	Silver nanoparticles of methanolic extract of *Gloriosa superba* tuber
$AgNO_3$	Silver nitrate
AgNPs	Silver Nanoparticles
AIDS	Acquired Immune Deficiency Syndrome
ANOVA	Analysis Of Variance
ANSA	1-Amino-2-Naphthol-6-Sulphonic acid
ARDS	Acute Respiratory Distress Syndrome
ATP	Adenosine triphosphate
Au	Gold
AUC	Area under the curve
Bad	Bcl-2-associated death promoter
Bak	BCL2-antagonist/killer
Bax	protein of the Bcl-2 gene family
Bcl2	B-cell lymphoma 2
BclXL	B-cell lymphoma-extra large
BRL	Buffalo rat liver cells
BSA	Bovine serum albumin
CAT	Catalase
CCl_4	Carbon tetrachloride
CDNB	1-9chloro-2,4-)Dinitrobenzene
cm	Centimeter

Cmyc	myelocytomatosis cancer oncogene
CO	Carbon monoxide
cP	centipoise
CSCs	cancer stem-like cells
CSSs	Colloidal silver solutions
Cu Kα	Copper X-unit
CV	– Central Vein
CVC	Central venous catheters
DLA	Dalton's Lymphoma Ascite
DLS	Dynamic Light Scattering
DMBA	7,12-dimethylbenz[α]anthracene
DMF	DiMethyl Formamide
DMSO	Dimethyl sulphoxide
DNA	Deoxyribonucleic acid
DNPH	2,4,Dinitro phenyl hydrazine
DPPH	1,1-diphenyl-2-picryl hydrazyl radical
DTNB	5,5'-dithio-2-nitro benzoic acid
EAC	Ehrlich Ascite Carcinoma
EC_{50}	Fifty per cent Effective Concentration
EDTA	Ethylene Diamine Tetra Acetic acid
EDX	Energy Dispersive Spectroscopy
EGCG–pNPAu	(−)-Epigallocatechin-3-gallate NanoGold particles
FAD	Flavin adenine Dinucleotide
FBS	Fetal bovine serum
fCC	face-centered cubic
Fe^{2+}	Ferrous ion
Fe^{3+}	Ferric ion
FITC	Fluorescein IsoThioCyanate
FT IR	Fourier Transform Infrared spectroscopy
FWHM	*Full Width Half Maximum*
GPx	Glutathione Peroxidase
GR	Glutathione Reductase
Grx	Glutaredoxins

GSH	Reduced Glutathione
GSSG	Oxidised Glutathione
GST	Glutathione S-transferase
H_2O_2	Hydrogen peroxide
H_2SO_4	Sulfuric acid
H_3PO_4	Phosphoric acid
HCl	HydroChloric acid
HEp -2	Human epidermoid larynx carcinoma-2
HGF	Hepatocyte growth factor
HPD	hematoporphyrin
HPTLC	High Performance Thin Layer liquid Chromatography
i.p	intra peritoneal
IC_{50}	Fifty percent Inhibitory Concentration
IMR	Human Neuroblastoma cell line
KCl	Potassium Chloride
KH_2PO_4	Potassium Dihydrogen Phosphate
kV	Kilovolts
LO_2^o	Lipid peroxide
LPO	Lipid Peroxidation
LSPR	Localized Surface Plasmon Resonance
MBT-2	Murine Bladder Tumor-2
MDL	Malondi Aldehyde
MDR	multiple-drug resistance
mg	milligram
mg/g b wt	Milligram per gram body weight
MGsL	Methanolic extract of Gloriosa superba leaves
MGsS	Methanolic extract of Gloriosa superba seed
MGsT	Methanolic extract of Gloriosa superba tuber
ml	millilitre
mm	millimetre
mM	millimolar
MTP	microtiter plate

MTT	2-(4, 4-diMethyl-2-Tetrazoyl)-2, 5-diphenyl-2, 4 Tetrazolium salt
N_2O_4	Dinitrogen tetroxide
N_3O_4	TriNitrogen TetaOxide
Na_2CO_3	Sodium carbonate
Na_2HPO_4	Disodium Hydrogen Phosphate
NaCl	Sodium Chloride
NaCN	Sodium Cyanide
NADH	Nicotinamide Adenine Dinucleotide
NADPH	Nicotinamide Adenine Dinucleotide Phosphate
NaOH	Sodium Hydroxide
NBT	Nitroblue Tetrazolium
NO	Nitric oxide
NO_2	Nitrogen dioxide
NPs	Nanoparticles
O_2.	Singlet oxygen
OD	Optical Density
OH.	Hydroxyl radical
$ONOO^-$	Peroxy nitrite anion
PAHS	Polycyclic Aromatic Hydro compounds
PARP	Poly (ADP-ribose) polymerase
Pd	Palladium
PE	phycoerythrin
PEG	Polyethylene glycol
PI	Propidium iodide
PKB	protein kinase B
PLA	Poly Lactic Acid
Pt	Platinum
PUFA	Polyunsaturated fatty acids
RBC	Red Blood Cells
RGD	arginine-glycine aspartate
RI	Refractive Index
RNS	Reactive Nitrogen Species

ROS	Reactive Oxygen Species
RSS	Reactive sulfur species
SD	Standard Deviation
SEM	Scanning Electron Microscope
SO	Superoxide
SOD	Super Oxide Dismutase
Srx	Sulfiredoxin
TBA	Thio Barbituric Acid
TBARS	Thio Barbituric Acid Reactive Substances
TCA	TriChloro Acetic acid
TEM	Transmission Electron Microscope
TLC	Thin Layer Chromatography
Tris HCl	Tris Hydrochloric acid
UHMWPE	Ultra High Molecular Weight Polyethylene
w/v	Weight per volume
WHO	World Health Organization
XO	xanthine oxidase
XRD	X-RAY Diffraction analysis

Publications

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