

CERTIFICATE

I certify that the thesis entitled "Therapeutic Effects of Silver Nanoparticles Synthesized Ethanolic Extract of *Boerhavia diffusa* L. on Experimentally Induced Diabetes and Obesity in Rats" submitted to the Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore - 641043, for the award of **Doctor of Philosophy in Biotechnology**, by Mrs. REENA JOY. A is the record of research work carried out by her during the period of study under my guidance and supervision, and 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.


01/12/2025

Signature of the
Head of the Department


01/12/2025

Signature of the
Supervisor


01/12/2025

Signature of the Dean
School of Biosciences

DECLARATION

I declare that the thesis entitled “**Therapeutic Effects of Silver Nanoparticles Synthesized Ethanolic Extract of *Boerhavia diffusa* L. on Experimentally Induced Diabetes and Obesity in Rats**” submitted to the Department of Biochemistry, Biotechnology and Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore-641043, for the award of **Doctor of Philosophy in Biotechnology** is the record of work carried out by me during the period of study under the guidance of **Dr. S. Gayathri Devi**, Professor, Department of Biochemistry, Biotechnology and Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, and 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



Signature of the Research Scholar



Signature of the Supervisor

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LIST OF ABBREVIATIONS

µg	–	Microgram
µg/mL	–	Micrograms per Milliliter
µL	–	Microliter
ABTS	–	2, 2'-Azino-Bis (3-Ethylbenzothiazoline-6-Sulfonic Acid)
ADA	–	American Diabetes Association
Ag	–	Silver
AGEs	–	Advanced Glycation End Products
AgNPs	–	Silver Nanoparticles
AI	–	Atherogenic Index
ALP	–	Alkaline Phosphatase
ALT	–	Alanine Aminotransferase
AMPK	–	AMP-activated protein kinase
ANOVA	–	Analysis of Variance
ANSA	–	1-amino-2-naphthol-4-sulfonic acid
AST	–	Aspartate Aminotransferase
ATP	–	Adenosine Triphosphate
BAT	–	Brown Adipose Tissue
BMI	–	Body Mass Index
BSA	–	Bovine Serum Albumin
BUN	–	Blood Urea Nitrogen
CAT	–	Catalase
C-RP	–	C- Reactive Protein
CTGF	–	Connective Tissue Growth Factor
DFU	–	Diabetic Foot Ulcer

DNPH	–	2,4-dinitrophenylhydrazine
DNS	–	Dinitrosalicylic Acid
DPPH	–	2,2-Diphenyl-1-Picrylhydrazyl
EBdAgNPs	–	Ethanollic Extract <i>Boerhavia diffusa</i> L. Synthesised Silver Nanoparticles
EDAX	–	Energy Dispersive X-ray
FBS	–	Fasting Blood Sugar
FDA	–	Food and Drug Administration
FRAP	–	Ferric Reducing Antioxidant Power
FTIR	–	Fourier Transform Infrared Spectrophotometry
GLP-1	–	Glucagon-Like Peptide-1
GLUT2	–	Glucose Transporter Type 2
GPX	–	Glutathione Peroxidase
GRP	–	Gastrin-Releasing Peptide / Glucose-Regulated Protein
GSH	–	Reduced Glutathione
HbA1c	–	Glycated Hemoglobin
HDL	–	High-Density Lipoprotein
HFD	–	High-Fat Diet
IC ₅₀	–	Half Maximal Inhibitory Concentration
IGF	–	Insulin-like Growth Factor
IL- β	–	1 β - Interleukin-1 β
LADA	–	Latent Autoimmune Diabetes in Adults
LDL	–	Low-Density Lipoprotein
LEPR	–	Leptin Receptor
MAPKs	–	Mitogen Activated Protein Kinases

MODY	–	Maturity Onset Diabetes of the Young
PCOS	–	Polycystic Ovarian Syndrome
PCR	–	Polymerase Chain Reaction
PPAR- α	–	Peroxisome Proliferator-Activated Receptor Alpha
PPAR- γ	–	Peroxisome Proliferator-Activated Receptor Gamma
RBP4	–	Retinol Binding Protein 4
RT-qPCR	–	Reverse Transcription Quantitative Polymerase Chain Reaction
SEM	–	Scanning Electron Microscopy
SGOT (AST)	–	Serum Glutamic-Oxaloacetic Transaminase (Aspartate Aminotransferase)
SGPT (ALT)	–	Serum Glutamic-Pyruvic Transaminase (Alanine Aminotransferase)
STZ-NI	–	Streptozotocin–Nicotinamide
TB	–	Total Bilirubin
TC	–	Total Cholesterol
TG	–	Triglycerides
TGF- β 1	–	Transforming Growth Factor- β
T _m	–	Melting Temperature
TNF- α	–	Tumor Necrosis Factor-alpha
TP	–	Total Protein
VEGF	–	Vascular Endothelial Growth Factor
VLDL	–	Very Low-Density Lipoprotein
WHO	–	World Health Organization
XRD	–	X-ray Diffraction