CERTIFICATE

I certify that the thesis entitled **"Structure Based Virtual Screening and Validation of Potential Quorum Sensing Inhibitors Against LasR in *Pseudomonas aeruginosa*"** submitted for the award of **Doctor of Philosophy (Ph.D.)** by **V. Aishwarya** is the record of research work carried out by her during the period from July 2018 to November 2022 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.

23/11/2022

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DECLARATION

I declare that the thesis entitled **"Structure Based Virtual Screening and Validation of Potential Quorum Sensing Inhibitors Against LasR in *Pseudomonas aeruginosa*"** 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 July 2018 to November 2022 under the guidance of **Dr. M. Rajeswari**, Assistant 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.

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Signature of the Supervisor

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V. Aishwarya

LIST OF PLATES

LIST OF ABBREVIATIONS

MDR	Multidrug resistance
AMR	Antimicrobial resistance
ECDC	European Center for Disease Prevention and Control
EU	European Union
EEA	European Economic Area
EPS	Exopolysaccharides
NIH	National Institute of Health
CF	Cystic fibrosis
WHO	World Health Organisation
QS	Quorum sensing
AI	Autoinducer
OdDHL	N-(3-oxododecanoyl)-L-homoserine lactone
C4-HSL	N-butyryl-L-homoserine lactone
PQS	2-heptyl-3-hydroxy-4-quinolone
QSI	Quorum sensing inhibitor
AHL	Acyl homoserine lactone
LBD	Ligand binding domain
DBD	DNA binding domain
DNA	Deoxyribonucleic acid
CADD	Computer aided drug discovery
ADMET	Absorption, Distribution, Metabolism, Excretion, Toxicity
SBVS	Structure based virtual screening
LBVS	Ligand based virtual screening
QSAR	Quantitative structure activity relationship
HAI	Healthcare associated infection
UTI	Urinary tract infection
eDNA	Extracellular DNA

AIDS	Acquired Immune Deficiency Syndrome
OMV	Outer membrane vesicle
NRPS	Non-ribosomal peptide synthetase
PLL	Phosphotriesterase-like lactonase
ATCC	American Type Culture Collection
PDMS	Polydimethylsiloxane silicone
CFU	Colony forming unit
DspB	Dispersin B
PNAG	Poly-b-1,6-N-acetyl-D-glucosamine
FDA	Food and Drug Administration
c-di-GMP	Cyclic diguanosine monophosphate
PDB	Protein Data Bank
OPLS	Optimized potentials for liquid simulations
RMSD	Root mean square deviation
MM-GBSA	Molecular mechanics/generalized born and surface area
MTT	3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide
Å	Angstrom
HTVS	High throughput virtual screening
SP	Standard precision
XP	Extra precision
SASA	Solvent accessible surface area
MD	Molecular dynamics
SPC	Single point charge
ns	Nanosecond
atm	Atmosphere
ps	Picosecond
K	Kelvin
RMSF	Root mean square fluctuation

R_g	Radius of gyration
PBL	Peripheral blood lymphocyte
RPMI	Roswell Park Memorial Institute
FBS	Fetal bovine serum
g	Gram
L	Litre
LB	Luria-Bertani
MTCC	Microbial Type Culture Collection
°C	Degree Celsius
OD	Optical density
nm	Nanometre
MIC	Minimum inhibitory concentration
CLSI	Clinical and Laboratory Standards Institute
µM	Micromolar
µl	Microlitre
CP	Ciprofloxacin
sub-MIC	Subinhibitory concentration
PBS	Phosphate buffered saline
ml	Millilitre
N	Normality
NaOH	Sodium hydroxide
NaCl	Sodium chloride
mm	Millimetre
µm	Micrometre
qRT-PCR	Quantitative real time-reverse transcription PCR
PCR	Polymerase chain reaction
FESEM	Field emission scanning electron microscopy
RNA	Ribonucleic acid

β	Beta
µg	Microgram
nM	Nanomolar
rpm	Revolutions per minute
ANOVA	Analysis of variance
mM	Millimolar
KPO_4	Potassium phosphate
$MgSO_4$	Magnesium sulphate
H_2SO_4	Sulphuric acid
BSA	Bovine serum albumin
NADPH	Nicotinamide adenine dinucleotide phosphate
mg	Milligram
DMSO	Dimethyl sulfoxide
HCl	Hydrochloric acid
$CaCl_2$	Calcium chloride
cDNA	Complementary DNA
GAPDH	Glyceraldehyde-3-phosphate dehydrogenase
ONPG	O-nitrophenyl-β-D-galactoside
$NaHPO_4.7H_2O$	Sodium phosphate dibasic heptahydrate
$NaH_2PO_4.H_2O$	Sodium phosphate monobasic monohydrate
KCl	Potassium chloride
$MgSO_4.7H_2O$	Magnesium sulfate heptahydrate
SDS	Sodium dodecyl sulfate
Na_2CO_3	Sodium carbonate
A_{420}	Absorbance at 420 nm
3D	Three dimension
TP-1	Triphenyl mimic of autoinducer
R^2	Correlation coefficient

H	Hydrogen
2D	Two dimension
ΔG_{Bind}	Binding free energy
SSE	Secondary structure elements
MSA	Molecular surface area
PSA	Polar surface area
C1	Compound 1
C2	Compound 2
C3	Compound 3
TCHM	Traditional Chinese Herbal Medicine
IFN-γ	Interferon gamma
TNF-α	Tumor necrosis factor alpha
hPON1	Human serum paraoxonase 1
U/l	Units per litre
EDTA	Ethylene diamine tetra acetic acid
PABN	Phenylalanine arginine beta-naphthylamide