

**Cancer growth suppression using purified  
azurin from native *Pseudomonas*  
isolates**

*Thesis submitted to  
the University of Calicut for the  
award of the degree of*

**DOCTOR OF PHILOSOPHY IN MICROBIOLOGY**

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Under the guidance of  
**Dr. DENOJ SEBASTIAN**



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## CERTIFICATE

This is to certify that this thesis entitled “**Cancer growth suppression using purified azurin from native *Pseudomonas* isolates.**” is a bonafide research work done by **Mrs. Sereena M C.**, under my supervision and guidance in the Department of Life Sciences, University of Calicut, for the award of the degree of Doctor of Philosophy in Microbiology, under the faculty of Science of the University of Calicut. I also certify that the same has not been submitted for any other degree diploma or associateship in any other University.

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I also hereby certify that the corrections/suggestions from the adjudicators have been incorporated in the revised thesis. Content of the CD submitted and the hardcopy of the thesis is one and the same.

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The Institutional Animal Ethics Committee of Amala Cancer Research Centre (No.149/PO/Rc/S/1999/CPCSEA) unanimously approved the animal experiments of the Ph.D. Thesis work of Sereena M.C., Research Scholar, Microbiology, Department of Life Sciences, University of Calicut entitled "Cancer growth suppression using purified azurin from native *Pseudomonas isolates*" (Approval No.ACRC/IAEC/2017[5]) carried out under the guidance of Dr. Ramadasan Kuttan.

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## **DECLARATION**

I, **Sereena M C.**, hereby declare that this thesis entitled “**Cancer growth suppression using purified azurin from native *Pseudomonas isolates*”** is being submitted to the University of Calicut, in partial fulfillment of the requirement of the degree of Doctor of Philosophy in Microbiology under the faculty of Science. This thesis is the result of my work carried out in the department of Life Sciences under the guidance and supervision of Dr. Denoj Sebastian, Assistant Professor in Microbiology, Department of Life Sciences, University of Calicut. This thesis or any part thereof has not been submitted for any other degree, diploma or any other similar title of any university.

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## ACKNOWLEDGMENTS

*This thesis has become a reality with the help and support of many individuals. I take this opportunity to extend my heartfelt gratitude to all of them.*

*First and foremost, I would like to extend my sincere gratitude to my research guide **Dr. Denoj Sebastian**, Assistant Professor of Microbiology, Department of Life Sciences, University of Calicut for having given me a chance to work under his wise leadership. His constant support, ceaseless motivation, encouragement and patience helped me in successful completion of the work. I could not have imagined having a better guide for my research work.*

*I express my gratitude to **Dr. E. Sreekumaran**, Head of the Department of Life Sciences, for providing the necessary facilities to carry out the work. I also extend my thanks to **Dr. Fathimathu Zuhara K**, Professor of Microbiology (Retd.), **Dr. B. S. Harikumaran Thampi**, Associate Professor in Biochemistry, **Dr. D. Gayathri Devi**, Assistant Professor of Biochemistry, **Mr. Emmanuel Simon**, Assistant Professor of Biochemistry, **Dr. Radhakrishnan G Pillai**, Assistant Professor in Physiology and **Dr. Vimal K P**, Guest Faculty, for their valuable suggestions and criticism during the work.*

*I express my gratitude to **Mr. Jamsheer N.P**, Librarian, Department of Life Sciences and all other **non-teaching staffs** of the department for their kind help and support.*

*I express my deepest gratitude to **Dr. Ramadasan Kuttan**, Director, Amala Cancer research Centre, Thrissur. Special thanks to **Dr. Babu T D**, Assistant Professor, Amala Cancer research Centre, Thrissur, for his kind help and support. I would like to thank **Mr. Arunanksharan**, Guest Faculty, St. Joseph College, Devagiri. for his help in anticancer studies. I convey my special thanks to **Dr. V. B Sameer Kumar**, Assistant Professor, Department of Biochemistry and*

*Molecular biology, Central University of Kerala. I am extremely grateful to **Dr. Sinosh Skariyachan**, Associate Professor in Biotechnology, Dayananda Sagar College of Engineering, Bangalore, for all his help extended to me during my work.*

*My special thanks to fellow lab mates **Mr. Bijesh K** and **Mrs. C. P Sreena**, for their constant support and suggestions throughout my work. I express my heart-felt gratitude to my colleagues **Mrs. Ambili M** , **Mrs. Rasiya K.T**, **Mr. Ahamed Shahal**, **Mr. Sreejesh P.G**, **Mr. Kishore M.H**, **Mrs. Abhini K.N**, **Ms. Akhila.B.Rajan**, **Dr. Reshma C.V**, **Dr. Shiji Thomas**, **Mrs. Deepa K.S**, **Dr. Seena T.P**, **Dr. Rahmath A**, **Mrs. Nithya Jayan**, **Mr. Abdul Bari K.K**, **Ms. Sneha G.K**, **Mrs. Rinju R**, **Mrs. Liji P**, **Mrs. Renu I.C**, **Mrs. Smitha Renganathan**, **Mrs. Chanchitha Chandran**, **Mrs. Chitra Pillai**, **Ms. Merin Rinky**, **Ms. Anusha T.P**, **Ms. Sruthi J**, **Ms. Nisha Rajan**, **Ms. Aparna Menon**, **Mr. Lijith K.P**, **Mr. Sajil K.K**, **Mrs. Hasna K. P**, **Ms. Vincy K**, **Mrs. Preenanka Rajan**, **Mrs. Steni K. Thomas**, **Mrs. Shabeera K**, **Ms. Nimitha**, **Mrs. Bindu**, **Mrs. Radhika** and **Mrs. Sreedevi Menon** for their support and co-operation. I also thank all the students of the department for their help during my work.*

*I am thankful to the University of Calicut for the financial assistance in the form of fellowship.*

*My sincere thanks to Credora Life Sciences, Bangalore, and Rajiv Gandhi Center of Biotechnology, Kerala for the services provided. Special thanks to **Dr. Abdul Jaleel K**, **Dr. Santhosh T R** and **Mrs. Asha Lekshmi**, RGCB for their valuable advices and help.*

*I also thank the staffs of Bina Photostat, Villuniyal for their help extended for printing and binding of the thesis.*

*I am thankful to all my friends especially **Mrs. Saranya K G** and **Mrs. Roshna R S** for their constant support, encouragement and love.*

*I am indebted to my parents, **Mr. Cherukutty** and **Mrs. Emily** for their boundless love, sacrifices, blessings and inspiration throughout my life. I am also thankful to my **sister** and **brother**. I would not be where I am today without their help and support. I take this opportunity to thank my mother-in-law, **Mrs. Leela** for her love, encouragement and moral support which helped me in successful completion of the work.*

*I am extremely thankful to my husband, **Mr. Sujith Charly** daughter, **Ms. Alen Mariyam** and son **Noah Charly** for the understanding and patience that they have shown to me. Their boundless love, co-operation and moral support have helped me to achieve my goal.*

*Finally, I express my sincere thanks to all who have directly or indirectly helped me in the successful completion of my thesis. I extend my greatest regards to the almighty for bestowing upon me the courage to face the complexities of life and complete this project successfully.*

**Sereena M C**



*Dedicated to.....*

*All those who supported me in this endeavor*

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## LIST OF ACRONYMS USED

AGE	:	Agarose gel electrophoresis
BSA	:	Bovine serum albumin
BLAST	:	Basic Local Alignment Search Tool
CTAB	:	Cetyl trimethylammonium bromide
DAPI	:	4',6-diamidino-2-phenylindole is a fluorescent stain
DLA	:	Daltons Lymphoma Ascites
DNA	:	Deoxyribonucleic acid
DMEM	:	Dulbecco's Modified Eagle Medium
EDTA	:	Ethylenediaminetetraacetic acid
EYFP	:	Enhanced Yellow Fluorescent Protein
ECFP	:	Enhanced Cyan Fluorescent Protein
Etbr	:	Ethidium bromide
FBS	:	Fetal Bovine Serum
FDA	:	Food and Drug administration
FRET	:	Fluorescence Resonance Energy Transfer
FTIR	:	Fourier-transform infrared spectroscopy
FSC	:	Forward Scatter
HIV	:	Human Immunodeficiency Virus
HCT 15	:	Human Colorectal Carcinoma
IMViC	:	IMViC: Indole, Methyl red, Voges-Proskauer, Citrate
IPTG	:	Isopropyl $\beta$ -D-1-thiogalactopyranoside
LB	:	Luria Bertani
LC-MS/MS	:	Liquid Chromatography with tandem mass spectrometry.
MALDI-TOF	:	Matrix Assisted Laser Desorption/Ionization Time of Flight

MEGA	:	Molecular Evolutionary Genetics Analysis
MCF7	:	Michigan Cancer Foundation
MCS	:	Multiple cloning sites
mM	:	Millimolar
MTT	:	3- (4,5-Dimethylthiazol-2-Yl)- 2,5Diphenyltetrazolium Bromide
NCBI	:	National Center for Biotechnology Information
Ni NTA	:	Nickel-nitrilotriacetic acid
PAGE	:	Polyacrylamide gel electrophoresis
PBS	:	Phosphate-Buffered Saline
PCR	:	Polymerase chain reaction
RD	:	Restriction Digestion
rDNA	:	Ribosomal DNA
RNA	:	Ribonucleic acid
rpm	:	Rotation per minute
SDS	:	Sodium Dodecyl Sulfate
SW480	:	Spectral Karyotyping of the Human Colon Cancer Cellline
SSC	:	Side Scatter
UV	:	Ultra Violet