

Acknowledgement

My road to earning my Ph. D. degree has been a lengthy one, and each day was an accomplishment. The journey was like climbing a mountain; once you reach the top, you see another mountain that needs to be climbed and you have to go on. This journey started in 2018 at the Department of Microbiology and Biotechnology Centre, MSU, Baroda, Gujarat, India and it has given me more than just a Ph.D. degree. Without many encouraging people by my side, notably family, a wonderful guide, good lab mates, and friends, this journey would not have been easy. For me, my Ph.D. journey was climbing a mountain where you cannot stop until I reach the peak. Starting from doing experiments, manuscript writing was like a journey and concluded with Ph. D. thesis. It imparted patience, perseverance, and the much-needed dedication and determination in each step.

First and foremost, I want to express my deep gratitude to Prof. Devarshi Gajjar, the coordinator of the Biotechnology program and my Ph. D. supervisor, for allowing me to work under her guidance. This journey would not be possible without her. I want to thank you for all of your encouragement, support, and sharing of immense knowledge throughout my Ph. D. journey. Also, valuable discussion from setting up an experiment to writing a manuscript and thesis. For encouraging me to do my best out of me. For a bit of time, she was a strict supervisor but from her heart she is a very kind person and needed time she gave good valuable advice from another perspective of life. I was lucky to have a such supervisor for my Ph. D. Another thing I would always remember she would always mention doing research that fills the gap which is much needed.

I would like to thank Prof. Archana Gattupali the Head of the Department for her valuable suggestion during my Ph. D. journey. She gave insightful advice during the annual presentation that helped me in my Ph.D. I also want to thank the rest of my committee: Prof. Anuradha Nerurkar, and Prof. Pushpa Robin for their informative feedback and support, as well as for the challenging question that motivated me to broaden my research and consider it from various perspectives.

I would also like to acknowledge Dr. Ratika Srivastava for setting up flow cytometry experiments and for the needful comments to improve my research work. Also, for allowing me to perform the flow cytometry experiments in her lab. I also acknowledge Dr. Pushpendra

Sir, Prof. Sanjay Ingle, Dr. Nandita Baxi, and Dr. Vyas Sir, and Prof. Mrinali Nair. Additionally, I would like to thank Prof. Harish Sir one of the CSIR Senior Research Fellow (SRF) Committee Members for his valuable suggestions in my research work. I want to thank Dr. Rajesh Patkar for letting me utilize the equipment from the Genome Research Centre (GRC) for fluorescence microscopy and cell growth experiments.

I am very grateful to Mr. Shirish Nagarkar for his constant assistance with the administrative work. He has been always sincere and supportive person throughout the paperwork from Ph. D. registration to thesis submission. His assistance made the administrative paperwork done smoothly. Apart from this, he has also helped in the documentation process regarding the CSIR-UGC fellowship. I would also like to thank Mr. Pravin Sir for helping me with document processing. I also thank Mr. Nitesh Bhatt for document processing whenever needed. I thank Mr. Harshuk Tank for always helping with the requirements for Ph. D. work. Many times, even though there was no signature of Ma'am on the issue slip, he permitted me to take many consumables immediately. Apart from this, he helped in ordering the requirements for the experiment and helping in managing the things for instrument repair especially RT-PCR (which was much needed for my experiments). He would make things run smoothly. I would like to thank Girish Bhai, (Late) Rameshbhai, and Prakashbhai for maintaining the lab's cleanliness. I also acknowledge Mrs. Aparna Ma'am, the Late Mr. Mandevkar Sir, and all the staff members in the department for their support and help.

I especially want to thank Principal Scientist S A Hasan of CSIR-EMR-I for his assistance in securing the CSIR-UGC NET certificate and also for his support when fellowship bills were not processed. He is the genuinely very kind and sincere person I have ever known. I thank CSIR-UGC for providing me with a fellowship since it helped me to survive.

I thank Dr. Swati Madhu for her support and my senior labmates. With her assistance, I have learned many things about lab management, instrument handling, and many other things. She made me to easily adjust the lab environment and assisted me with many of the lab requirements, and thesis writing. I will always cherish the moments spent with her. I also thank Dr. Siddhi Desai for welcoming me to the DGL lab, talking with me about the workflow, guiding me in setting up flow cytometry experiments, and many other things. She frequently advised me to analyze the result carefully and data interpretation. She helped me a lot during my 1st manuscript writing and even for thesis writing. She has always been supportive and there for me whenever I needed her. Along with Dr. Swati Madhu and Dr. Siddhi Desai, Miss Siddhi

Chavan, Mr. Siddesh Vishvakarma, and Dr. Rinku Shahu always make the chai break and discussions enjoyable for me. I would like to thank Suraj Shukla for all the help he has provided me with the whole Genome Sequence analysis, including handling MSc students and taking their late duties many times. Additionally, I enjoyed the conversations that take place during the frequent lunch breaks that cover topics other than science. The newly joined member Ms. Purvi Joshi has helped in many things from RNA isolation to RT-PCR experiments. She also helped me a lot in managing the lab and fine chemicals. I want to thank Ms. Pinal Trivedi for helping with lab handling and conversation during the lunch break. I would like to thank newly joined Mr. Milan Rathod and Ms. Heli Upadhyaya for their help and support. I will always cherish the enjoyable times we had in the lab, the quick excursions in between, and the dinner gatherings. With them, the conversation around tea time was also a lot of fun. Thank you DGL lab, which holds a lot of memories.

I want to thank other friends in the department Miss. Roshni Patel for constant support during the doctoral studies. The small breaks, like having tea and endless discussion with her, are something that I will always cherish. I am also thankful to Miss. Humayara Khan for having the discussion, support, and many dinner parties with her. I am also grateful to Dr. Hasmat Buchad for helping me with the persister cells data analysis and also assisting me in the persister cell manuscript. She has helped me a lot during the manuscript writing from start to end. I am also very thankful to Ms. Khushboo Rana for helping me out in the flow cytometry experiments whenever needed. Additionally, Mr. Anand Parnandi has also helped in setting the instrument for the bacterial growth curve. I also thank Dr. Vihang Thite, Miss Juliya Thomas, Miss Purna Trivedi, Mr. Anand Parnandi, and all the research students in the department. These memorable moments with lab mates (Dr. Swati Madhu, Dr. Siddhi Desai, Mr. Suraj Shukla, Ms. Purvi Joshi, Ms. Pinal Trivedi, and Mr. Milan Rathod) as well as departments friends especially with Ms. Roshni Patel has mental relevant days from hectic Ph. D. life.

I like to thank Miss Kranti Bhamnote and Miss Krupa Prajapati, MSc. Dissertation students, for assisting me with kill curve experiments, Fluorescence/ Confocal Laser Scanning Microscopy as well as RNA isolation for Persister cells studies. They helped me a lot in handling each of the experiments. Additionally, I want to thank Ms. Jhalak Agarwal for her help in the studies regarding biofilm resistance.

Last but not least, I want to express my gratitude to my father for his unwavering support and belief in me during my entire Ph.D. journey. He has always been by my side, serving as my

Acknowledgement

mentor and advisor, and always there for me. From my heart, I thank whatever you have given me. I also want to thank my mummy for all the emotional support she provided me with during this journey. In addition, I want to thank Maasa and Maasi, other members of my family, for their support. My role model Chakudi was also present to provide ongoing assistance. The best sister I could have ever had. She was always there for me and often advised me when I was feeling down. I want to express my gratitude to my cousins, brothers, and sisters because they were always there for me whenever I was feeling down.

I thank IIT Bombay for allowing me to perform CLSM, SICART for FEG-SEM, ICMR for its research grant (Project number: 5/4/3/2012-RMC for providing necessary consumables), the Government of India's DST-FIST program for infrastructure support, the Vikram Sarabhai Institute of Cell and Molecular Biology (VSI-CMB) for its on-site Confocal Laser Scanning Microscopy facility, and SICART for (Carl Zeiss LSM 710).

I sincerely express my gratitude to the all-mighty God for his blessings, as well as for giving me courage and encouragement throughout my Ph. D. journey