

## Acknowledgement:

Today, while taking a halt for some time at the milestone named "Thesis" on way of my voyage, when I look back at the path I have traversed since several years, I realized that this journey was full of joy, sorrow, thrill, shock giving goose bumps like a track route passing through the deep dense forest. "The Maharaja Sayajirao University of Baroda, Vadodara" was the forest which nurtured and strengthened me to walk through the trail. The path was having numerous twists, turns, troughs and ridges like a roller-coaster ride, neither easy nor smooth. Sometime it landed me at the top of the mountain, and sometime at the bottom of the valley. The good and the bad experiences on the path taught me worldly life and how to survive in unfavourable conditions with converting them to the favourable ones. In few words, renovation of the waste to their best. I express my gratitude to this place. With each blink of my eyes, several people came to my mind, whom I met on this route and without their help it was impossible to complete the expedition. It is impossible to thank each and every one from them individually but I must name those giants who pushed me ahead in direction of my dreams.

Prof. Anuradha S Nerurkar, my mentor, stood the first amongst them. Madam, I am really grateful to you, for accepting me as your Ph.D. student on my single request. Your helpful, caring, patient and soft-spoken nature are the qualities which have always inspired me to work with you. Whenever I came to you with a query, "मॅडम, एक विचारायच होत...!", it never went unanswered or unresolved. You are the best counsellor I ever had in my downs, and the best critic I ever had during my ups, I hope this will go on... Though, saccharification of plant biomass was new array for both of us, the hour-long discussions on the references and experiments with open end conversations were the most inducing and inspiring part to design new experiments and push the research ahead. Your interest in the topic, eagerness to know the results while I was performing the experiments, timely inputs and evaluation during the work, and ready to write nature for any external support, are the best features of the mentor, one has ever expected from theirs. One step ahead of a guide, you have become like a mother to me in every sense who taught her child how to spread the wings and how to fly for "38<sup>th</sup> SBFC, USA" and how to defend but not to cry on rejection of publications. The words "विहंग चा अर्थ आणि त्याचा स्वभाव माहित आहे का? विहंग म्हणजे पक्षी, आणि एकदा जर आपले पिल्लू आकाशात भरारी घेता शिकले तर ते घट्ट्यात परत येणार नाही हे माहित असून पण त्यांना उडायला शिकवून स्वप्नांची भरारी घेताना बघणे तोच पक्ष्यांचा स्वभाव" influenced me to become a great learner and a humble tutor. They will always be carved on my heart and will be assuredly reflected in my behaviour. The two great words "Thank You" still fall a short to express my all gratitude towards you madam for your contributions.

Now it's time to thank few other giants who allowed me to step on their shoulders and expanded my ability to see the farthest I can. Prof. Anjana J. Desai the former HOD (2005-2010), Department of Microbiology, is first one of them. She is a lady with majestic personality and yet humble in her behaviour. She was

the one who approved the beginning of my journey as a Microbiologists at this department in 2009 as a master's student. I am thankful to madam for her support. Polite nature of hers will be the unforgettable thing I have ever seen in a HOD. Any suggestion or opinion given by her about any doubt regarding experiment, conferences or thesis was reflecting her experience and the foreseeing about the work. Prof. T. Bagchi, the former HOD (2010-2015), Department of Microbiology, is another one of them. Time punctuality and time management, these two are the major learnings I have learned from you sir. How to take an unbiased decision after looking for both pros- and cons- of a decision is the art to learn from you. I am obliged to you sir for putting your trust in me for appointing me as a Temp. Teaching Assistant and grooming for the first job experience. Sir I heartily express thanks. Dr. Nandita Baxi is the next person. Once upon a time she used to be my dissertation guide during my M.Sc. Since then, the bonding between student and teacher had developed. Here nature to care about small things had made me learn how to solve the issues without making them big. Thank you, ma'm, for your all support throughout the time and I hope it will continue even after this journey ends.

I am grateful to Prof. G Archana, present HOD, Dept of Microbiology, for providing us the required instrument facilities. Your skill to analyze the data with a glance on the graph had mesmerized since my M.Sc. It is the thing to learn from you madam. Thank you for all of your support you gave throughout this journey. I heartily thank Prof. Sanjay Ingle and Prof C. Ratna Prabha for being members of my Doctoral Advisory Committee and also for their valuable suggestions they gave during the annual presentations. I am also grateful to Dr. Pranav Vyas, Dr. J Manjarear, Dr. Mrinalini Nair, Dr. Bina Chandani, Dr. Devarshi Gajjar, Prof. A. K. Shah and Late Prof. B. B. Chattoo for their valuable suggestions they gave during the presentations and the things they made me learn during my stay in the department. I also thank Dr. Rajesh Patkar, Dr. R. Shrivastava and Dr. P. Singh for the help and guidance they gave me.

I am also thankful to Dr. Kishor Rajput and his lab members, Ajit and Amit for helping us in the microtome sectioning of SCB at Dept. of Botany. I am thankful to Dr. Kasthuri Venkateswaran, JPL, NASA, for providing the type strains for identification studies on a single request. I am thankful to Dr. Yogesh Shouche and his lab members as well as Dr. Amaraja Joshi and Dr. Neetha Joseph for teaching me the analytical skills for bacterial identifications during my Ph.D. I also thank Dr. Bragdish Iyer for his valuable suggestion in drawing conclusions.

I thank nonteaching staff of department, everyone has played his or her own role superbly during my Ph.D. Shirish sir was ready to any required official documents or to resolve any query regarding the fellowship. Mandvekar sir was a source of any protocol or chemical in any emergency. Talati sir was a prosperous source indeed for books, consumables and chemicals. Praveen sir and Seema ma'm provided an unaltered supply of glassware and distilled water. Thomas ma'm was the official source of cakes during the Christmas. Panchal sir and Harsukh sir were the support whenever required. Nitesh sir, Varghese sir and Nair sir also helped in many formalities to be carried out at department and university.

Jayeshbhai, Nileshbhai, Chimanbhai, Pradeepbhai, Gisrishbhai, Rameshbhai, and Mukesh, had played a decent role in maintaining the department on its line. I heartily thank all of them for being with me whenever I was in need. I am also grateful to the Office staff, Faculty of science and University office for timely support in the lengthy administration work of fellowships.

The dissertation during M.Sc. was a wonderful experience which seeded me to pursue the doctoral studies. It was a proud moment to claim that, no research scholar from the department refused to help me for completion of my dissertation and that bridged me strongly with them, no matter it was, RL-II, RL-I, GFL, DBL, MNL. My initial phase of Ph.D. was the time where many of them have completed theirs and moved ahead. At completion of my Ph.D. I feel to recall all of them to thank for their help and critics. Dr. Harish Suthar, Dr. Krushi Hingurao, Dr. Ruchi Chaturvedi, Dr. Murali Sharaff, Dr. Priyadarshan Keluskar, Dr. Radhika Yadav, Dr. Priya Pillai, Dr. Anoop Markande, Dr. Jagat Rathod, Dr. Aparna Akolkar, Dr Anil Singh, Dr. Shrinandan C., Dr. S. Gangavarappu, Dr. Ketan patel, Dr. Sumant Chaubey, Ms. Sanjukta, Dr Sandip Patil, Dr. Sandip Gaudana, Dr. Akhilesh Dhanani, Dr. Abhik Saha etc.

The nature's law "Face the fear and grow stronger" suits me a lot. I stepped only two times during my M.Sc. in RL-II as I was afraid of being scolded, and the destiny landed me in the same place to spend the several years of my Ph.D. journey. The tough training as a lab junior during initial period, indeed helped me a lot for maintaining the lab and surviving in the department. Dr Ruchi C (the speaker) and Dr. Murali Sharaff (the silent listener) are the two pillars from RL-II with whom I shared each and every joy-trouble of the lab life. Dr. Krushi Hingurao was the anger management system for me, I missed those ANGRY BIRDS HITS after you left the department. Dr. Harish Suthar is the gentle man I have met till now and the person always ready to help. Dr. Priyadarshan Keluskar and Dr, Radhika Yadav were also support when I was in need. Mr Vimal Maisuriya, my table senior was the good rich source of plastic and glass consumables which I used. The RL-I was a great source of fun whenever I went there. Dr, Priya Pillai was like an elder sister, who inquired every time how my work is going and helped me by forwarding reference papers every now and then. Dr. Jagat Rathod the Enfield giant, was the person who helped me for an overnight stay first time in department. I remember that 3.00 am food at goodies and the haunting tales of the department. Dr. Anoop Markande who got a designation of "Dada" was the unmentioned unconditional crime partner in every crime of mine, no matter they were picnics, they were parties or they were leg-pulling, Thanks for making the randomly planned Pawagadh and the Junagadh trips few of the most memorable trips of my life. Dr. Sneha Garge was my immediate senior from ASN group and provoked to prove the identity of my *Bacillus* isolates at species level during those elaborative discussions at lab meetings.

The current members of the lab are not less worthy. Ms. Aparna Shirshat is a permanent member and mother of the of RL-II. Thanks for the moral and mental support you provided during ups and downs of Ph.D. tenure. Ms. Mansi Agrawal (aka MA and the lost symbol) is the Stress Queen of the lab, who is most

of the times lost in her thoughts and a treasurer of lab fund in RL-II. Thanks for convincing me on several topics tactically. Ms. Abhi Shah is the Soil Queen of the lab, who dig the earth till several meters just to study the bacteria. Thanks for those frequent homemade pendas and kajukatri sweets. Mr. Mihir Sarang is the Most Eligible Bachelor of the department. His ready to help nature is add on to that. Thanks for taking my invigilation duties in emergency and a wonderful Dumas Trip on beach. Ms. Swati Telang is the Drama Queen, the Annapurna and the photographer of the lab. She was one of the helping hand while I was in last phase of my bench work. I will miss the food she used to bring for lab. Ms. Roshni Patel is the Reactor Queen, here and there thinking of reactors for her work. Ms. Kinnary Iyer was also of great help. The RL-II had become my home, pilgrim, hotel, playground, theatre, warzone and every place where u can enjoy all tastes of life. I wil miss those food parties, those cooking classes, those hot (verbal) and cold (silent) wars, those GOT broadcasts, those gujju movie trailers to decide which one to watch in theatre, those planned and vailed picnics, and so many things.

I am also thankful to the present members of RL-I, Mr Jeetendra Gosai, Ms. Siddhi Vora, Ms. Shweta Talreja, Mr Ashtaad vesuna, Ms. Reshma Shaikh for the support they provided every time, whenever I was in need. I am also greatful to the GFL members Dr. Jigar Shah for sharing my fellowship pains, Ms. Jaswinder Saini, Ms. Juliya Thomas, Ms. Prachi Gandhi, Mr. Anand Dave, Ms. Dipeskhsa Hansoti for being helpful during all situations. Dr. Manikandan, Ms. Anuja Malgaonkar, Ms. Hasmat Buchad, Ms. Neerali Patel, Mr, Jaymin Mehta, Ms. Ruchi Jharivala, Ms. Sejal Chauhan, Ms. Hemanti Mondal, Ms. Siddhi desai, Ms. Swati Khatri, Ms. Hiral patel, Dr. Hashim Reza, Dr. Chandraparakash, Dr. Vikas Mehra, Dr. Sushma Meshram, Dr. Varsha M., Ms. Hiral Shah, Mr. Divya Purohit, Ms. Khyati Mehta, and Mr. Aanad are also acknowledged for their helps during my Ph.D.

I am thankful to the UGC for providing me Research Fellowship in Science for Meritorious Students (RFSMS) under BSR scheme which helped me to pursue the Ph.D. I am thankful to DBT and CICS for providing the Travel Grant and Partial support to attend the International conference and present a part of my Ph. D. work at USA. I am thankful to the resource persons at SAIF and IRCC units at IIT-Bombay for allowing me to perform SEM studies and confocal studies. I am thankful to the resource person at FTIR lab CRF-IIT-Kharagpur for the help and assistance in FTIR analysis.

A warm thank to the food and tea vendors at Dairy-Den Circle and canteens. The place where we used to forget our all clashes, tensions, fights, workloads and enjoyed the tea and morning-evening snacks. A cup of tea was used to be the solution of any tension for us. Those days will be missed forever.

I am thankful to the students who came as dissertation students and became good friends, Maulik B., Madhvi B. Manjiri M., Tarannum A., Anwit P., Ruchi A., Preeti B., Kesha P. are the ones who shared my workbench with me. The students from batch 2011-13 are the special ones which today also make my Mumbai trips memorable. Pragati, Pooja, Ruby, Shehnaz, Aakanksha, Shruthi, Janardan and Mayur are few of them who are more like friends and less like students now. My gratitude to Prasad Shukre, Bhushan Gandhi, Rakesh Yadav and

Shailesh Lad for helping me whenever I visited Pune and Mumbai.

My supports and best buddies Vipul and Kevin are the ears ready to listen anything from me. Thanks for understanding my silence, during the months we didn't even talk due to my late night long stays in lab. This never created a difference between us. I will be grateful to both of you guys for my life.

The three great powers who carved me today as I am, the Almighty and my AAI-BABA. After reaching at this stage, when I recall the events of past, I believe that the superpower exists as almighty. He smoothly runs the system and makes sure that a right person reaches at right time at right place. He is the one who gave all the moral support and strength to work during this tenure. My AAI-BABA are the greatest inspirations I had ever. I will never forget the hunger, my AAI faced just to have a bit of dinner together with me at night when I return to home from lab and the shouts, she made to wake me up early in the morning. I can't forget the support from BABA whenever I was requiring it. He still understands many things and let me go without a question ahead. It's both of you because of whom I am completing this thesis today. Though I thank them, the words I am putting here are not sufficient to complement the time hat together we have lost forever during this journey.

**VIHANG  
(KALARAV)**