Acknowledgements

It is, indeed, a great pleasure to thank all those who have directly or indirectly helped me in the successful completion of this work.

I wish to express my profound gratitude, devotion and respectful regards to my research Guide Prof. S. P. Govindwar, (Head, Department of Biochemistry, Shivaji University, Kolhapur). He has been such a candid guide to me and I had sensed that his emphasis is not to teach but to let me learn. His scientific acumen and the ability to give importance to right things at right time would always be helpful to me in my life. His constant support, affection, encouragement at every stage made my task much easier. Perhaps the best way to thank him, I feel, is to be honest and creative in my scientific carrier ahead. I remain owe towards him forever.

My deep appreciation, cordial and sincere thanks to Prof. Jo Shu Chang (Energy/Environmental Biotechnology and Biochemical Engineering Lab, Department of Chemical Engineering, National Cheng Kung University, Taiwan) for his excellent advice, encouragement, invaluable discussion and correcting the research papers and especially for giving me permission to carry out some part of research work and providing the laboratory facility. I have learnt a lot of from his meticulous planning, implementation, dedication and hard work.

I am highly grateful to my teachers of the Department of Biochemistry and Biotechnology; Dr. Mrs. J. P. Jadhav, Dr. K. D, Sonawane, Dr. Mrs. A. U. Arvindekar, Dr. P. M. Gurao, Prof. V. A. Bapat and Dr. Mrs. P. B. Dandge whose suggestions were always useful to me. I extend my sincere thanks to the entire faculty as well as the administrative and non-teaching staff of the Biochemistry and Biotechnology Department and University for their cooperation.

I express special thanks to technical staff of USIC and CFC Department, Shivaji University, Kolhapur for providing the fabrication and characterization facilities.

I wish to express my deep sense of love, appreciation to my husband Dr. Ganesh D. Saratale (Post Doctoral Fellow, National Cheng Kung University, Taiwan) who is the chief source of my inspiration. Without him and his kind support, coordination and proper guidance this work would not have got off the ground and gone the places that it did and the time and effort, he invested in helping me at every moment of my research work, I bow down to him for everything.

I owe my warmest thanks to my Dada (Dr. Shrikrishna D. Saratale, Reader, Department of Physics, University of Pune, India) for his moral support, kind guidance through fruitful discussion
during the Ph. D. work whose goodwill and continuous inspiration far exceeds what the words of
appreciation can express.

I am grateful to all my research colleagues and all research scholars of the Biochemistry and
Biotechnology Department for their constant encouragement and valuable suggestions during research
work. I thank to all my seniors for their help and encouragement. I also like to extend my thanks to all
my friends and all my juniors who helped me with all possible ways during my work.

It is my solemn duty to thanks Mr. G.D. Patil, Secretary, Shree Warana Vibhag Shikshan
Mandal, Warananagar for their encouragement and words of appreciation. I cannot forget the
assistance and cooperation given to me by the Department of Biotechnology Engineering, TKJET,
Warananagar, Kolhapur. I offer my heartfelt thanks to all my B.E. (Biotechnology Engg.) students.

My stay in National Cheng Kung University, Taiwan was enriched by many experiences, I
have gone through and I have pleasure to feel immensely thankful to all members of NCKU lab
especially to Dr. Chun-Yen Chen, Dr. Shing Der Chen, Mr. Yung-Chung Lo, Mr. Wei Chen Kao, Miss
Kue- Ling Yeh and Miss Alicia for their kind cooperation during my research work and who could
accept me as I am and all the more grateful to those who could not.

There are no words to express my gratitude towards my loving Baba, Bhaú, Mom and Aái,
who are responsible to make this dream come true and for their understanding, patience and moral
support and encouragement without whom, my work would not have seen the light of day. I express
my deep sense of gratitude for their love and blessings.

My warm feelings towards my family members my brothers (Pranav dada, Shrikrishna dada
and Mahesh bhaiya) for their patience and for providing me the most favorable atmosphere for my
education, continuous inspiration, encouragement, blessings and best wishes. They have tried to keep
me cheerful throughout, which enabled me to complete this piece of work.

Especially I must owe to my loving maternal and paternal grandfather and grandmother for
their blessings and being able to constantly sustains and encourage me. I am very much thankful to my
relatives and friends, for their role in motivating me for taking this course.

Last but not the least I express my deep sense of gratitude to all my well-wishers and friends,
who does not belong to our Department, for their moral support to complete this work successfully.

I apologize if I missed someone.

(Mrs. Rijuta Ganesh Saratale)