ACKNOWLEDGEMENT

God has hidden all the treasures of wisdom and knowledge in Christ
COLOSSIANS 2:3

With these words, first and foremost I would like to thank my Lord and saviour Jesus Christ who has been the source of wisdom, knowledge and strength in my life forever. It is only by His grace that I am able to complete my Doctoral degree.

I shall be lacking in my duties unless I put into words my gratitude and humbleness to Honorable Vice Chancellor, Prof. (Dr.) R. B. Lal, Vice-Chancellor, SHIATS and Bishop of Yeshu Durbar congregation, SHIATS, Allahabad, whose fatherly affection, constructive suggestions, encouragement, assistance and candid approach of critical analysis of the subject stored me to drive to the goal.

I cordially thank Prof. (Dr.) S. B. Lal, Pro Vice-Chancellor (Pro Vice Chancellor Administration, SHIATS) and Prof. (Dr.) A. K. A. Lawrence (Pro Vice Chancellor Academics, SHIATS), for their invaluable support, encouragement and unfailing help, concern and benevolent advice rendered to me.

This acknowledgement seems to be incomplete without the names of Prof. (Dr.) Robin L Prasad (Registrar, SHIATS) and Prof. (Dr.) C. Kole, Dean, Jacob School of Biotechnology and Bioengineering, SHIATS, whose consistent help has only led me to the completion of this thesis.

I would like to express my sincere thanks and acknowledge indebtedness to my advisor Dr. (Mrs.) Pragati Misra for her constant support, keen interest, valuable suggestions and patient attitude during the course of my research.

I avail this opportunity to express my profound gratitude and indebtedness to my co-advisor Dr. Satendra Singh for his inspiration and guidance throughout my research period.

I would like to express my sincere thanks and acknowledge indebtedness for constant support to the members of my SAC Prof. (Dr.) George Thomas, Head, Department of Molecular and Cellular Engineering, SHIATS, Dr. Alok Milton Lal, Head, Department of Biochemical and Bioprocess Engineering, SHIATS and Dr. Suchit A. John, Associate Professor, Department of Biological Sciences, SHIATS.

I would like to express my sincere thanks to Prof. (Dr.) Pramod W. Ramteke, Dean PG studies, SHIATS whose consistent help, valuable suggestions, inspiration and guidance enabled me to complete my Degree.
I am grateful to my colleagues Dr. Rohit Lal, Dr. Jonathan A. Lal, Dr. Jishnu Naskar, Dr. Rajeev Kant, Dr. O. P. Verma, Dr. (Mrs.) Poonam Singh, Dr. Gurudayal Ram, Dr. Amit A. Charan, Mrs. B.K. Alex, Dr. E.P. Koshy, Dr. Preetam Verma, Ms. Ann Maxton, Mr. Shubhendra S. Chauhan at the Department of Molecular and Cellular Engineering, Jacob School of Biotechnology and Bioengineering, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Deemed to be University Allahabad. I also owe a special thanks to Mr. Vishal Prasad, Mr. Amit Aggrawal, Mr. Vimlesh, Mr. Awadesh Kumar, Mr. Dayashankar and Mr. Ronel Edward Marshall for their invaluable help during my study research work.

I wish to express my grateful thanks to all the teachers from my schooling days onwards and my well wishers as well to my critics, who have directly or indirectly helped me to reach up to this level in my life. Last but not the least, I expect that my thesis would prove to be worthy in your liberal hands.

I can never find words to express my feeling and gratitude to my loving mother Late Mrs. Amarjeet Rani, without her love, constant support and the lessons she taught me in life, it would not have been possible to accomplish this task. I am forever grateful to her. I am grateful to my Father for educating me, loving me and supporting me till this day which made me to reach this day. I am thankful to my siblings for their constant support and love. I am also grateful to my in-laws for their prayers and support.

I find no such measure, adequate to quantify, all that my husband Mr. Ben Bailey has done for me. Words with me are insufficient to express the feeling of my heart to acknowledge him for his love, prayers and support without which this work would not have seen the light of the day at all.

Last but not the least I would like to thank my loving daughter Cheryl Christina Bailey who patiently allowed me to complete my thesis.

Date : ...........

Place : Allahabad

Shashi Bernice Bailey