ACKNOWLEDGEMENT

In the name of God, most Gracious, most Merciful. One of the joys of completion is to look over the journey past and remember numerous people including all my well wishers, my friends, colleagues, and family members who have helped and supported me along this long but fulfilling road. I wish to express my sincere appreciation to those who have contributed to this thesis and supported me in one way or the other during this amazing journey.

First of all, I am extremely grateful to my guru, my supervisor, Professor Tek Chand Bhatta Chairman Department of Biotechnology, Himachal Pradesh University, Shimla-171005 for his guidance and all the useful discussions and brainstorming sessions, especially during the difficult conceptual development stage. His deep insights helped me at various stages of my research. I could not have asked for better role models each inspirational, supportive and serene. I could not be prouder of my academic roots and hope that I can in turn pass on the research values and the dreams that they have given to me. He played a great role in the development of my vision for the research and other aspects of life.

As a mark of respect, a special thanks to Dr. A.K Bhatt, for his guidance, support, and encouragement. Under his guidance, I successfully overcame many difficulties and learned a lot not only regarding my research but in my personal life too.

I express my sincere and hearty gratitude to faculty members Prof. S. S. Kanwar, Prof. (Mrs.) Reena Gupta, Dr. Duni Chand, Dr. Wamık Azmi, for their valuable pieces of advice and guidance. I extend my thankfulness to Er. J. S. Sodhi, for his kind support and making me familiar with the various sophisticated equipments available in the Department of Biotechnology.

I heartily acknowledge the help and support provided by ministerial and technical staff of the Department Mrs. Mohini Sharma, Mr. Babu Ram, Mr. Ram Chand, Mr. Narender Nepta, Mr. Haridesh Bharti and others for their generous help during my Ph.D work. I am grateful to the staff of Bioinformatics Centre, H. P. University, Shimla Mrs. Leena, Mr. Nikhil and Mr. Manoj for allowing me to avail facility of the center, Department of Biotechnology, H P University, for their help & I am also thankful to the library staff.

It is inevitable to recognize the kind co-operation and help I received from my grand grand seniors Dr. Savitri Kapoor, Dr. Jog Raj, Dr. Hemant Verma, Dr. Madan Verma, Dr. Nitya Nand Sharma, Dr. Unmesh Narta, Dr. Deepak Pandey, Dr. Rajender Kumar, Dr. Shukla, and my seniors Dr. Amit Seth, Dr. Amit Prush, Dr. Praveen Mehta, Dr. Shashi Kant Bhatia, Dr. Navdeep Thakur, Dr. Lata Kpoor, Dr. Sarita Kapoor, Dr. Minakshi Chandel, Dr. Meenu Thakur, Ms. Shikha Thakur and Ms. Simran who helped me during the present work.
A very warm and special thanks to my labmates and friends Ani, Kunzu, Vijay, Viru, Monu, NK, Ashif, Vijya, Neerja, Nauni, Mani, Tani, Sumita, Nitin, Nadda, Shidu, Sakshi, Sukhi, Neelam and Rinni and all M.Sc, M.Phil students.

Heartiest thanks to my NRCBS MKV Madurai group and my foreign friends Dr. Anand Kumar Balakrishanan, Dr. Vasudevan, Dr. Kapil, Dr. Rakshak, Amandeep Sokhal, Zeenat Khan, Priyush Babel, Anand Krishna, Satish, Shweta, Nilam Kaur, Priti, Dhiraj, Agam, Sanju, Deepu, Tiru, Rakesh, Baldev and Chandan.

Very special thanks to the UGC for financial support in the form of Rajeev Gandhi National Fellowship. It would have been impossible for me, even to start my research had they not provide me scholarship for my Ph.D.

A heartfelt thanks to the really supportive and encouraging, my senior, my lab mate, as well as my younger brother Dr. Shashi Kant Bhatia who made this experience something special, particularly in completing my Ph. D and this thesis right from the beginning to the end.

I would not have contemplated this road if not for my parents Sh. Karam Singh Bhatia and Smt. Bimla Kumari, who instilled within me a love of creative pursuits, science, all of which finds a place in this thesis. To my parents, a deep heartfelt thank you. Words cannot express the feelings my in-laws (Sh. Ram Nath Kalsia and Smt. Veena Kalsia) for their constant unconditional emotional support. A tender thanks to my sister Swarna, jiju Rakesh, Nehul, Rishu, Arun, Renu and Er. Prnav.

Finally, I would like to acknowledge the most important person in my life my wife Ritu and my daughter Shaina. They have been a constant source of strength and inspiration. I can honestly say that it was only their determination, constant encouragement and sacrificed time that ultimately made it possible for me to see my Ph.D thesis through to the end.

Date: 24th June, 2013

Place: Shimla

(Ravi Kant)