ACKNOWLEDGEMENTS

I foremost owe my thanks to Almighty Lord Subramania who blessed me by turning “nothing to something-the best” by leading me constantly and victoriously with strength, courage and patience to carry out this work.

Writing a dissertation can be a lonely and isolating experience, yet it is obviously not possible without the personal and practical support of numerous people that have assisted during the development and research stages of my career. The journey was not always trouble-free, ridded with pitfalls and disappointments, but somehow I managed to persevere and learn so much about life along the way. I could never have completed this goal without the help, support, guidance and efforts of many people.

I am privileged to thank Prof. P. Murugesan, Chancellor, PRIST University, Thanjavur, Tamil Nadu for his encouragement by way of sanctioned university stipend and permitting me to utilize all the facilities available in the university to complete the research work.

With heart and soul I wish to place on record my heartfelt thanks and gratitude to my respected Guide Dr. S. Ravikumar, M.Sc., M.Phil., Ph.D., Dean, Faculty of Biotechnology, PRIST University, Vallam, Thanjavur, Tamil Nadu who made a never fading impact on me through his meticulous guidance, stead fast inspiration, untiring patience, non-compromised, constant motivation and ready help rendered in research and personal care with doting heart. My sense of gratitude to his will preserve till eternity.

My sincere thanks to Dr. N. Ethirajalu, Vice-Chancellor; Dr. P.S.M. Kannan, Pro-Chancellor (Administration); Prof. C. Nagarajan, Pro-Chancellor (Academic); Dr. K.V. Balasubramanian, Registrar; Dr. G. Govindarajan, University Academic affairs and Dr. G. Kuppuswamy, Director, Centre for Research and Development, PRIST University, Vallam, Thanjavur, Tamil Nadu for their encouragement and inspiration throughout the course of my study.

I am ever obliged to the most respected traditional healer Vaithiar Ayyathurai Konar, Elumalai, Peraiur Taluk, Madurai, Tamil Nadu for his benevolent support, and gave many valuable informations about the plant during my studies.
My heartfelt thanks to all scientists particularly Dr. R. Elango Mathavan, Dr. S. Ramesh, Dr. S. Sankar Samipillai and Dr. S. Patharajan of Centre for Research and Development, PRIST University, Vallam, Thanjavur, Tamil Nadu for their support, help and goodwill provided at the time of my research work.

I express my thanks to Dr. R. Dinakaran Michael, Director, Centre for Fish Immunology, Lady Doak College (Autonomous), Madurai and Dr. K. Venkatraman, Retd. Head, Department of Zoology, The Madura College (Autonomous), Madurai, Tamil Nadu who gave initial guidance of fish immunology work.

My indebted thanks and gratitude to Dr. Krishnan Pandian, Scientist, Division of Fishery Sciences, Central Agricultural Research Institute, Andaman & Nicobar Islands for his timely suggestions, support and guidance to complete my work.

I am very grateful for having an exceptional doctoral committee and wish to thank Dr. A.V.P. Karthikeyan, Assistant Professor, Department of Botany, Government Arts and Science College, Karur, Tamil Nadu and Dr. M. Mariappan, Assistant Professor, Department of Zoology, Government Arts and Science College, Karur, Tamil Nadu for their continual support and encouragement.

My profound thanks to Mrs. A. Sona Chandran, Head, Department of Biotechnology and Mr. G. Nagarajan, former Head, Department of Pharmacy, PRIST University (East Campus), Thanjavur, Tamil Nadu for permitting me to utilize all the facilities available in the department to complete the study.

I also extend my heartful thanks to Mr. S. Ilavenil, my Doctoral Research colleague who has been at my beck and call and keyed up from head to foot in the completion of my work. It is the cumulative efforts of the above minds working together day and night that gave me the contentment of completing the task. and Mr. D. Karthik, Scientist, Genei biotech lab Pvt. Ltd, Bangalore, Karnataka for his moral support with the development of the research design and providing constructive suggestions along the way.

I acknowledge my sincere thanks to Golden fish farm, Karandhai and Chola fish farm, Vaduvur, Thanjavur, Tamil Nadu fish farmers, for their timely help and continuous fish contribution throughout my study.

My sincere gratitude to the Research Scholars Mr. C. John Wesly Kirubakaran, Centre for Fish Immunology, Lady Doak College (Autonomous), Madurai, Tamil Nadu; Mr. S. Ezhilvendan, Entomology Research Centre, Loyola College, Chennai, Tamil Nadu;
Mr. P. Nagendra Prabu, Department of Biochemistry, Madras University, Chennai, Tamil Nadu; Ms. P. Sumita, Department of Microbiology, Bharathidasan University, Trichy, Tamil Nadu; and Ms. Balabirami, Centre for Research and Development, PRIST University, Vallam, Thanjavur, Tamil Nadu; for their compassionate support, help and goodwill provided by them at the time of my research work.

I extend my heartfelt thanks to Mr. A. Thirunavukarasu, Assistant Professor, PSG College of Technology, Coimbatore, Tamil Nadu for his timely help and contributive support for my project.

Faculties in the Faculty of Biotechnology, PRIST University, Thanjavur, Tamilnadu assisted and encouraged me in various ways during my course of studies, but I am especially grateful to the Ms. R.V. Hemavathy, Assistant Professor, Department of Biotechnology, P.R. Engineering College, Thanjavur, Tamil Nadu.

I would also like to express my appreciation to Department of Gastroenterology, Christian Medical College, Vellore, Tamil Nadu for Transmission Electron Microscopy (TEM) analysis.

It feasts my mind to thank B. Tech students Mr. Ravichandran and Mr. S. Saravanan for their timely help and kind cooperation during the entire period of my study.

My preferred thanks to Mrs. K. Gomathi, DTP operator and Mr. V. Janakiraman, Lab Assistant, Faculty of Biotechnology for their timely help and kind cooperation in all stages of work.

I also express my sincere thanks to my well wisher Dr. T. S. Saravanan, Assistant Research Officer, Institute of Veterinary Primitive Medicine, Ranipet, Vellore, Tamil Nadu and Mr. P.C. Kannabiran, Area manager, Bombay dyeing, Madurai, Tamil Nadu for their constant support and encouragement throughout my study.

I cherish to acknowledge the benevolence of my beloved Parents, Father In-law and his family for their prayers, blessings, encouragement, enthusiasm, co-operation and support without which I would not have been able to successfully pursue the course of my study. With love and affection, I am deeply thankful to my dear brother Mr. B. Poovalinga Ganesh, for his immense love, valuable help, moral support and ever encouraging presence.
I feel honoured to acknowledge the contribution to my beloved wife K. Sukanya without her patient understanding, moral support and encouragement this thesis would not have seen the light of the day.

In this study, direct or indirect help and suggestions were received from a large number of individuals, books and published works. Sincere efforts have been made to acknowledge or to refer them; still it is not unlikely that some of them have not been acknowledged due to inadvertence. I thank each and every soul behind the endeavor of mine.

B. KALEESWARAN