I would like to express my deep sense of gratitude to Dr. Neela Emanuel, Lecturer, Department of Chemistry, Faculty of Science, The M. S. University of Baroda, for suggesting this topic and guiding me through the difficult times. Her contribution, (scientific and otherwise) to my student experience here has been invaluable. Surviving through the strain of the research career would not have been possible without her help and friendly nature. Her untiring help throughout my research work is gratefully acknowledged.

I would also like to record my sincere gratitude to my Co-guide Dr. G. Pratapasenan, Reader, Department of Botany, Faculty of Science. He took personal interest in my research work and eagerly encouraged me to express my ideas. Many thanks to him for the constant encouragement and critical suggestions during the field experiments.

- Prof. A. C. Shah, Head, Department of Chemistry, Faculty of Science has given me permission to carry out the research work in the department laboratory. I greatly acknowledge his encouragement and help during my research work.
- Prof. J. V. Amin, constantly urged me during the early years of my research work, without his help and critical suggestions it would not have been possible for me to complete my soil analysis experiments.

Prof. Andrew B. Bocarsly and his group at Frick Chemistry Department, Princeton University, USA, taught me to face the difficult situation during the research work. His ideas and problem solving nature helped me a lot.

My sincere thanks to Prof. A. K. Rakshit and Prof. P. K. Bhattacharya for their constant encouragement.

In my research work I was helped by many people in Chemistry department as well as in other departments. I am sure that I will not be able to recall all the names. Dr. Roychen Joseph, Dr. Ajith Cheriyan and Dr. Ajith. S., left me with many a pleasant memory. Dr. Anoop Kumar, Dr. Saji Oommen, Dr. Murukesan, Dr. G. Pradeep Kumar, Ajith Kumar, Prasad, Ramesh, Vinod and P. K. Pradeep were very helpful. Their company in the department and late night discussions in the hostel, made the life in Baroda enjoyable.

I owe a lot to my dear friends G. Biju Kumar, C. A. Sureshan and Dr. B. Suresh who have shared my excitements and frustrations. Their support and constant encouragement helped me in completing the thesis.

. My laboratory life with Dr. Mukesh, Dr. Manjula and Mr. Prakash Samnani was very enjoyable. Their support and help during the research work are greatly acknowledged.

Dr. Krishnan and Bindu, Murali and Lathika, Dr. Senan and Mrs. Lilly Senan-their homes and the company of their family have been a relaxing place from the hectic life in the laboratory.

Sincere thanks to Jayendra Singh Parmar, Jayesh Gosai and Rajesh Patel for their help during the field experiments.

My earnest thanks to Prof. K. T. Kunchikrishnan Nambiar and Prof T. V. Atchuthan Nair, Department of Chemistry, Payyannur College, Payyannur, Kerala, who taught me the basics of Chemistry.

Thanks to Mr. Duke Emanuel for helping me to bring the thesis in the final form.

Financial assistance provided by O. N. G. C. Mehsana Project, during the research work is greatly acknowledged.

Finally, my heartfelt gratitude to my Father, Mother, Brother, Sister, Brother-in-law, Uncle and Aunty. Without their constant encouragement and support it would not have been possible for me to complete my research work.

Gireesh Kumar, M. P.