ACKNOWLEDGMENTS

First of all, I am highly thankful to almighty God, without whose grace and mercy, I could not have completed this research work. Having reached the goal of completing this miniature research programme, I feel my duty to look back and ponder over the twist and turns. Working on a doctoral program can be an isolating experience, yet not possible without the involvement of many people. I would like to acknowledge many for helping me during the entire period.

Words are not enough to express special thanks to my mentor and advisor, Dr. I. H. Farooqui, Associate Professor, Civil Engineering Department, Faculty of Engineering and Technology, A.M.U, Aligarh, man with greatest impact on my professional life, for persistently stimulating my analytical thinking and arming me with the wisdom to handle this research. Despite his extraordinary work schedule, with often wedging my unannounced visits into an exhausting workday, he was never too busy to give encouragement, suggest caution, or review work speedily when asked.

He has guided me from the very first day in to my Doctoral program and furnished me with the tools that I needed to finish this work with the best of my ability. I have a great esteem for his courteous and conscientious to teaching and research work, for providing me with an opportunity to study and work in his research group, and his patience throughout all stages of this work.

I must express my sincere thanks to my research Co-supervisor, Dr. Abdul Malik, Associate Professor, Department of Agricultural Microbiology, Faculty of Agricultural Sciences, A.M.U., Aligarh, who has given generously of his time and expertise through the work period. His kindnesses allowed me autonomously to synthesize, develop and execute the research work. He has an excellent sense of humour and a sensitive hand in guiding. His graciousness and professional elegance will remain to be the principle of my life.
I am getting short of words to express my gratitude to Prof. M.M. Ashhar, Chairman Civil Engineering Department, Faculty of Engineering and Technology for his ever help willing attitude, unceasing encouragement and co-operation.

I wish to thank for meticulous work of Dr V.C. Srivastava, Department of Chemical Engineering, I.I.T., Roorkee, for his help in obtaining XRD and TGA analysis of biosorbent samples and their interpretation.

My debt of gratitude can hardly be paid to Dr. Anwar Khursheed, Associate Professor Civil engineering section, Faculty of Engineering and Technology A. M. U. Aligarh, for his enormous support pledged for the completion of my degree.

I cannot even express my deep regards and feelings for Mr. Imran Qayyum (B.Tech, 1st year) but surely almighty who knows all, that is seen and unseen is watching and may He shower his choicest blessings on him and reward the best of the future in life and hereafter. I am also indebted for helping me in times of need and it was his work support that added to my work and personality.

More than any other, I must give special thanks to my spouse, Naima Bilgrami, who has been a constant source of moral support to me. She gave up valuable space to accommodate my work, precious time and energy to help me throughout this research work.

I express enthusiastic thanks to Nadia Bilgrami, Research Scholar, to keep my spirit upright, her unflagging belief that despite the incomprehension about what I do, I must complete my research work on time. I also thank her for considerable caring, priceless and warm encouragement, which allowed me to overcome all sufferings and gave me strength to continue.

My own Abdullah and Zainah, as you grow up, you will have a lot to know about the height of the hills and depth of valleys we managed together to assemble a kind of Father you will be proud of. I know, it was unbelievably rough and tough, at times, beyond such little souls can handle. I thank you for bearing with me.
Special thanks are always due to my brother Haroon Ashfaq, Assistant Professor, Electrical Engineering Department, Faculty of Engineering, Jamia Millia Islamia, New Delhi, who had always played a key role as technical advisor at critical stages of my life.

I am thankful for having received much assistance from numerous co-workers, who cherish me despite my eccentricities. I risk doing them a disservice by not mentioning all of them here, but plead paucity of space.

I dedicate this work and express my deepest gratitude to my beloved parents, to whom I own my existence, happiness and achievements. They gave me endless love, boundless mental and financial support and were there throughout the years. They are the pillar of my standing and have lovingly nurtured my dreams to become true and stood by me throughout the thick and thin. They always deserve a very special attention.

AHMAD ASHFAQ