

# *Dedication*

To my parents, who always encouraged me to follow my dreams, nurtured my passion for science, and never stopped believing in me, and my grandparents, who showered me with their blessings and helped me make the best decisions when I felt lost.

# *Declaration*

I declare that the thesis entitled 'BIOCHEMICAL AND MOLECULAR CHARACTERIZATION OF PHOSPHATE SOLUBILIZING MICROORGANISMS ISOLATED FROM TEA PLANTATION SOIL OF DARJEELING HILLS" has been prepared by me under the supervision of Dr. Malay Bhattacharya, Assistant Professor of the Department of Tea Science, University of North Bengal. No part of the thesis has formed the basis for the award of any degree or fellowship previously.

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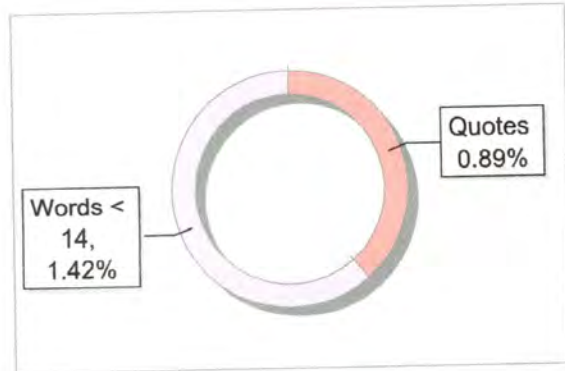
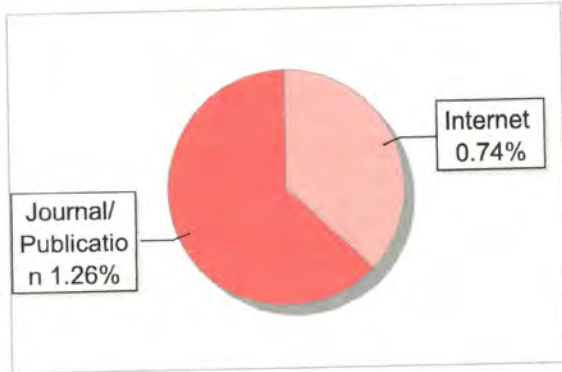
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**Title** BIOCHEMICAL AND MOLECULAR CHARACTERIZATION OF PHOSPHATE SOLUBILIZING MICROORGANISMS ISOLATED FROM TEA PLANTATION SOIL OF DARJEELING HILLS  
**Paper/Submission ID** 1438730  
**Submitted by** nbuplg@nbu.ac.in  
**Submission Date** 2024-02-16 11:07:17  
**Total Pages** 158  
**Document type** Thesis

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Student Papers	Yes
Journals & publishers	Yes
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# *Preface*

*You have to dream before your dreams can come true.*

*~ Dr. A.P.J. Abdul Kalam*

My love and interest in science budded at a very young age, back when I was in elementary school. To realize the role and importance of science in everyday life, we were assigned to enlist every aspect of daily routines where science was at play. The endless list only got me more intrigued to observe and learn more. Residing in a society where numerous superstitions played a significant role and shaped the outlook of the people, my parents delved into inculcating a sense of judgment through reasoning and scientific basis. This inclination was further extended by my teacher, Mr. Nabarun Mondal, who made learning fun and interesting and helped me build a strong base, advancing beyond the syllabus to satiate my hunger for knowledge. He taught me to think big and aim at the sky, and accept every opportunity to follow my dreams. Since then, I have been determined to contribute to the field of science, as small as it may be, with the then President of India, Dr. A.P.J. Abdul Kalam, as my role model.

Though the journey has not been a bed of roses and some people around me derided me for dreaming big of being a scientist, affecting my confidence for a while, in the long run only to act as a pullback to soar higher and help me build a strong resolute to make my dream a reality, as Walt Disney had quoted “All our dreams can come true, if we have the courage to pursue them”. And years after, in 2018, I set out to commence my new journey as a Ph.D. scholar in the Molecular and Tissue Culture Laboratory in the Department of Tea Science, University of North Bengal, under the supervision of Dr. Malay Bhattacharya. It was an overwhelming experience as it was a big leap towards the fulfillment of my as well as my parents’ dream. Words are simply not enough to express my gratitude to my supervisor, Dr. Malay Bhattacharya. He believed in and encouraged me throughout these years of my learning and put forth positive challenges in my path to help shape me as a successful researcher and individual. His role in this journey has been

pivotal in inculcating deep thinking and analyzation quality, and never stopping me from feeding my boundless curiosities. His unwavering faith in me over the last few years has pushed me further to invest my best in every phase of my research life. I also extend my heartfelt gratitude to my thesis research committee members, Dr. Sonali Ray (Assistant professor), Dr. Chandra Ghosh (Associate professor) and Dr. Biswajit Sinha, for their support and valuable feedback. I am also thankful to Dr. Tanmayee Mishra for her kind words and support. I would also like to thank Mr. Mainak Mukherjee (Soil analyst) who helped me learn a few techniques in soil analysis. My appreciation also goes out to our department's non-teaching staff members, Mr. Subhash Singha, Mrs. Kalpana Subba and Mrs. Doli Mahato, for their cooperation.

I am especially indebted to Sukanya Acharyya, my fellow lab mate, roommate, and my closest friend from my post-graduation journey. She has been my rock and helped me learn and grow. She has been a very important figure in all my highs and lows during my tenure, with whom I've shared all my successes and failures, laughs and tears. She has been the greatest critic, but always had my back through any adversities. The list might go on. I greatly value your companionship. I am also profoundly grateful to my fellow lab mates and seniors, Arindam Ghosh, Soumya Majumder, Sahadeb Sarkar, Dr. Sourav Chakraborty, Dr. Reha Labar and Dr. Gargi Sen, and my juniors Preeti Subba and Sudeshna Nandi. They have been a source of constant motivation in every phase of this journey. Starting from our sample collection journeys to attending conferences and endless discussions in the laboratory regarding work and others, it has always been enlightening and fun. They had so much to offer and I consider myself lucky to get to know them all and learn so many things. I also extend my humbleness to the other scholars of this department, who have been a constant source of support in this endeavour.

I take this opportunity to offer special thanks to my close friends Sudipta Bhattacharjee, Baishakhi Ghosh, Priya Bhuiyya, Debrupa Sarkar, Moumita Mukherjee, Subhashree Mandal, and Suchaita Ghatak, who have been all ears to the quibbles and bants and yet understood and encouraged me and helped bring a smile on my face in my lows. I acknowledge their constant and unconditional support in these days when true friendships are rare. Also, a huge thanks goes to my energy source in the early mornings and late nights, coffee, and everyone who provided me with this fuel.

Last but not least, this whole journey and learning experience would not have seen the face of the day without the immense support of my parents. They are the roots of the flourishing career choices that I made way back. They are the source of my dreams and the most important figures to allow me to keep dreaming and taking every necessary step to put life to it. No acknowledging words are enough to express gratitude for the sacrifices they made all their life by giving me the space and time to be a self-dependent individual. Ma and Bapi, I promise to make you proud one day.

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