This Thesis is Dedicated to My Beloved Parents

DECLARATION

I declare that the thesis entitled "**SYNTHESIS AND CHARACTERISATION OF HOST-GUEST INCLUSION COMPLEXES FOR BETTER APPLICATIONS BY PHYSICOCHEMICAL TECHNIQUES**" has been prepared by me under the supervision of Dr. Mahendra Nath Roy, Professor of Chemistry, 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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CERTIFICATE

I certify that Mr. Pranish Bomzan has prepared the thesis entitled "**SYNTHESIS AND CHARACTERISATION OF HOST-GUEST INCLUSION COMPLEXES FOR BETTER APPLICATIONS BY PHYSICOCHEMICAL TECHNIQUES**", for the award of Ph. D. degree from University of North Bengal, under my supervision. He has carried out the work at the Department of Chemistry, University of North Bengal.

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I would like to acknowledge my beloved friend, Ms. Subarna Thapa, Department of Food Technology, University of North Bengal for her kind cooperation associated with my PhD research work.

I am always aware of the huge debt that I owe to the sources of information required for my research work - the numerous books, monographs, articles, websites, etc. I put my gratitude to those whose publications I have cited in this thesis.

I also would like to thank to the editors, reviewers and other staff of various publication houses for timely publishing my research works.

I must acknowledge all my respected teachers who taught me chemistry in Ghoom Boys' H.S. School, St. Robert's H.S. School, Darjeeling Government College and University of North Bengal. The knowledge I gained from them has really facilitated me in my research work.

I would like to express my gratitude to all my colleagues for their encouragement and support all the times throughout my research work.

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I would like to acknowledge my beloved friend, Ms. Subarna Thapa, Department of Food Technology, University of North Bengal for her kind cooperation associated with my PhD research work.

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PREFACE

The research work described in this thesis entitled **"SYNTHESIS AND CHARACTERISATION OF HOST-GUEST INCLUSION COMPLEXES FOR BETTER APPLICATIONS BY PHYSICOCHEMICAL TECHNIQUES"** was started in January 2019 under the supervision of Prof. Mahendra Nath Roy in Department of Chemistry, University of North Bengal.

This research work involves thorough exploration of formation of host-guest inclusion complexes of various cyclodextrins and calixarenes with phytochemical compound, antiplatelet agent, sunscreen agent and amino acids by highly sophisticated calorimetric, spectroscopic techniques and various physicochemical methods. Besides this, biological activity, thermal stability, solubility, and photo stability of some inclusion complexes have also been investigated.

In the journey of this research work I was delighted to participate in various seminars/ conferences across the country. I was highly nurtured and motivated by interacting with distinguished scientists and researchers, which helped me a lot in my research. I am also very happy to publish my research works described in this thesis in reputed international journals.

In writing this thesis all scientific observations of other researchers related to the concerned work have been duly acknowledged. I must admit the responsibility of any unintended exclusion and mistake, which might have crept in spite of insurances.

I expect further challenges in my life in order to exercise my earned knowledge for the development of the society.

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LIST OF PUBLICATIONS

1. Molecular encapsulation study of indole-3-methanol in cyclodextrins : Effect on antimicrobial activity and cytotoxicity

Journal of Molecular Structure, 1225 (2021) 129093
(Included in the Thesis)

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2. Inclusion of an antiplatelet agent inside into β-cyclodextrin for biochemical applications with diverse authentications

Food Chemistry Advances, 1 (2022) 100015
(Included in the Thesis)

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3. Exploring β-CD grafted GO nanocomposites with an encapsulated fluorescent dye duly optimized by molecular docking for better applications

Journal of Molecular Liquids, 329 (2021) 115481

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4. An extensive investigation on supramolecular assembly of a drug (MEP) with β-CD for innovative applications

Journal of Molecular Liquids, 344 (2021) 117977

5. Synthesis and Characterization of an Inclusion Complex of DL-Aminoglutethimide with β-Cyclodextrin and its Innovative Application in a Biological System : Computational and Experimental Investigations

ACS Omega, 2022, 7, 11208 – 11216

6. Probing Host–Guest inclusion complexes of Ambroxol Hydrochloride with α- & β-Cyclodextrins by physicochemical contrivance subsequently optimized by molecular modeling simulations

Chemical Physics Letters, 748 (2020) 137372

7. Inclusion of tyrosine derivatives with α-cyclodextrin in aqueous medium of various pH conditions by surface tension, conductance, UV-Vis and NMR studies

Journal of Molecular Liquids, 230 (2017) 104 – 112

8. Studies of solvation behaviour of LiI prevailing in diverse solvent systems conductometrically and spectrometrically supported by ab initio technique

Chemical Physics Letters, 671 (2017) 7 – 14

LIST OF SEMINARS/CONFERENCES ATTENDED

Sl. No.	Seminar/Conference	Date/Year	Organizer and Venue	Role
(1)	National Conference on "Environmental Determinism, Diverse Pollutions, Sources, and Controlling Management through Sciences and Humanities"	March 22-23, 2021	Alipurduar University	Oral Presentation
(2)	National Seminar on "Frontiers in Chemistry"	March 05, 2020	Department of Chemistry, University of North Bengal & CRSI North Bengal Local Chapter	Poster Presentation
(3)	SERB sponsored National Conference on "Green Chemistry : An Alternative of Conventional Chemistry"	September 20-21, 2019	Coochbehar Panchanan Barma University	Poster Presentation
(4)	National Seminar on "Frontiers in Chemistry 2019"	2019	Department of Chemistry, University of North Bengal & CRSI North Bengal Local Chapter	Participation