Dedicated
to
My Beloved Parents

DECLARATION

I declare that the thesis entitled **Some Novel Transition Metal Complexes of Polydentate Ligands: Synthesis, Physico-Chemical Characterization and DNA Interaction Study** has been prepared by me under the supervision of Prof. Biswajit Sinha, Department of Chemistry, University of North Bengal. No part of this thesis has formed the basis for the award of any degree or fellowship previously.

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CERTIFICATE

I declare that **Mr. DIPU KUMAR MISHRA** has prepared the thesis entitled **Some Novel Transition Metal Complexes of Polydentate Ligands: Synthesis, Physico-Chemical Characterization and DNA Interaction Study** for the award of Ph. D degree of 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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Anti-Plagiarism Report of the Ph. D Thesis

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PREFACE

I started the research work presented in this thesis entitled **Some Novel Transition Metal Complexes of Polydentate Ligands: Synthesis, Physico-Chemical Characterization and DNA Interaction Study** in the year 2013 under the supervision of Prof. Biswajit Sinha in the Department of Chemistry, University of North Bengal, India. In recent times, research on the detection and fixing of DNA defects at initial phase has received much attention and to diagnose / fix such defects various probes have been examined. Researchers to solve this issue have visualized the idea of binding event of any foreign molecule with biomolecules just like the Guest-Host interaction and Lock and Key Concept. In early studies researchers primarily used various organic molecules to facilitate such interaction with DNA. But ever since the establishments of cis-platin as chemotherapeutic agent, transition metal complexes have accessed much attention as they have the superiority of showing different geometries: the reactivity of transition metal complexes can be modulated by simply altering the metal ions and their oxidation states. Despite the success of cisplatin as anticancer agent, its clinical usefulness is limited by its severe side effects. The necessity of alternatives to cisplatin has inspired the researcher to do further work towards the improvement of novel metal-based drugs with superior properties.

The present dissertation focused on the synthesis, Physico-Chemical characterization and DNA interaction ability of newly synthesized transition metal complexes.

Acknowledgement

First of all I pay my heartfelt gratitude to **Almighty God** who guided and provided me the strength, patience and required courage to complete this work after all the challenges and difficulties. Without his blessings, all my endeavours would not turn into achievements.

I feel great pleasure to express my respect and sincere gratitude to my supervisor **Prof. Biswajit Sinha,** Professor, Department of Chemistry, University of North Bengal for his continuous support, valuable guidance, constructive criticisms, insightful suggestions, continuous encouragement and unfailing patience over the years at every stage of my research work.

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I am happy to acknowledge the services of SAIF-NEHU (SHILONG), CDRI, (Lucknow), IIT (Chennai) for their help in sample analyses. I would also like to record my thankfulness to the Departmental Special Assistance Scheme under the University Grants Commission, New Delhi, India (SAP-DRS-III, No. 540/12/DRS/2013) for financial and instrumental assistance as well as to the University Grants Commission, New Delhi, India for granting me UGC-BSR Research Fellowship in Science (Ref. No: f.25-1/2013-14(BSR)/7-133/2007(BSR)) during my research period.

Only words are not adequate to translate my thanks to my senior and junior lab mates for their valuable suggestions and cooperation at during my experiments and data analysis. I am extremely thankful to Department of zoology and Department of Tea science, N.B.U for providing me to access their lab regarding some biological analyses**.**

I owe a special thanks to my parents, **Mrs. Mina Mishra** and **Mr. Surendra Mishra** for their love, understanding, encouragement and belief in me. They are my source of motivation and patience. Throughout my research journey I was lucky to have support from of my brother-in-law (**Mr. Koushikinath Misra**) in all respects. My loving thank to **Miss. Ritu Mishra** (didi) and **Mr. Santosh Mishra** (elder brother), for their support and guidance. I would also like to convey my heartfelt thanks to my **in-laws (Mr. Prodyut Chakraborty, Mrs. Prativa Chakraborty)** for their moral support, vibrant love and affection throughout my research period.

Last but not the least, I am extremely thankful to my Wife, **Mrs. Rimpa Chakraborty** for her unprecedented cooperation and moral support throughout my life and during this work.

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