

PREFACE

I started the research work presented in this thesis entitled **“Efficacy of Transition Metal Complexes of Some Polydentate Ligand Systems As Potential Plant Nutrient Supplements: A Morphological And Biochemical Study”** in the year 2014 under the supervision of Prof. Biswajit Sinha and the co-supervision of Dr. Prahlad Deb in the Department of Chemistry, University of North Bengal, India.

Deficiency of micronutrients in soil is a global problem. It is always challenging to solve the micronutrient deficiency by adding supplements without hampering the soil nature and the environment. Conventional micronutrient supplements, being mostly ionic in form, in most of the cases are responsible for the alteration of the pH of the medium. Such challenges always bring the opportunities to develop unique alternative methods having synergistic behavior. The synergistic behavior leads to improve performance of materials and substantially make the environment sustainable.

Due to the versatility in the donor sites, Schiff bases can form complexes with almost all the transition metal ions. Although they were very well known but their applications in various fields of chemistry make them interesting till today. Complexes of transition metal ions with Schiff bases provide a large and growing class of compounds with both stereochemical and magnetochemical interests. They can act as synthetic models of metal containing sites for various metalloproteins and metalloenzymes. Unsymmetrical Schiff base ligands have many advantages over their symmetrical counterparts in the elucidation of the composition and the geometry of the metal binding sites in the metalloprotein and the metalloenzymes and the selectivity of the natural systems with synthetic materials. Schiff base transition metal complexes are often superior to conventional micronutrient supplements in various concentration ranges. The procedures of preparations of these compounds are very simple and thus can be synthesized in large scale. Therefore heavy metal Schiff base complexes can be used as supplements to meet up micronutrient deficiencies and at the same time they can minimize the toxicity generated by application of different heavy metals. However these aspects must be further enquired at multi-locations and varied environmental conditions to draw a direct conclusion about the superiority.

The present dissertation is focused on the synthesis and physico-chemical characterization of some polydentate Schiff base metal complexes of Zn, Cu and V and their application as potent micronutrient supplier in some plants.