Preface

Pollution is spreading like wildfire in many regions of the world. The two most significant types of pollution would be air and water pollution. Pesticides can contain a variety of toxic chemicals. These chemicals can benefit our society and can also be very harmful. The primary reason for water pollution is due to the use of pesticides in the agricultural areas. Human eagerness is to perform the better with respect to food production, energy and convenience products in order to ameliorate the way of life, led to a tremendous growth in the usage and production of pesticides. The chemical technology has now penetrated into major areas of human activities and lifestyle of human being. This rapid change introduced a large variety of pesticides into the environment. These agrochemicals entering by into the ecosystem and effect the animal life, ultimately man. The unabated expansion concern of toxicological pollution and left a trail of anxiety on concerned topic.

The Guntur district, which is situated on the western river bank of the Krishna, the lower reaches is an agriculturally predominant region in Andhra Pradesh, India. Traditionally both the wet and dry lands are suitable for the crops like paddy, black gram, green grains, tobacco, cotton and chilies. The unchecked and unscientific use of the pesticides by farmers to destroy the pests that are damaging crops, invariably results in the transportation of pesticides by several means to nearby aquatic systems where they affect the non-target organisms. There is a gradual evolution of the pesticides starting from natural to organic and inorganic chemicals among these the organic and synthetic chemicals from the major bulk of pesticides are being used.

For the last few years, classes of organic compounds like Carbamate (CM) have captured a major share in the market. Among the CM, Pyraclostrobin is being
approval to Remove New York State Aerial Application Prohibition for Headline Fungicide (EPA Re.No.7969-186) Containing the Active Ingredient Pyraclostrobin (chemical code: 099100). “New York State Pesticide Product Registration Procedures” (April 2009). BASF Corporation registers a product that contains Pyraclostrobin, used by the agriculture farmers to control different types of fungal diseases affecting the crops. Hence, therefore it has become a possible contaminant in aquatic systems in and around of the agriculture area. However, significant fish toxicity did result when Pyraclostrobin was applied when fish were stressed by high water temperature and low dissolved oxygen conditions.

Earlier reports of literature survey indicate that the pyraclostrobin is toxic to the aquatic organisms including fish. This survey reveals that, fungicides do have the property of concentration and accumulation in different tropic levels of the food chain. The present study is based on the hypothesis that, pyraclostrobin have an acute toxic action and as well as chronic on the freshwater fish, *Labeo rohita*. This study is presented in seven chapters.

The **first chapter** deals with the introduction of the work includes the history of chemicals, classification of pesticides, Carbamate and their use in India and the structure and chemistry of the selected fungicide Pyraclostrobin.

The **second chapter** deals with the review of literature on the effect of pyraclostrobin fungicide in different animals in understanding the biochemical and physiological aspects, carbohydrate metabolism, protein metabolism, oxygen consumption, Histopathological changes and haematological changes.

The **third chapter** deals with the effect of toxicity of pyraclostrobin on freshwater fish *Labeo rohita*. The acute toxicity tests were conducted with static renewal method for 96hrs with pyraclostrobin commercial grade of formulation with
20% WG. It has been found that the toxicant is toxic to the fish. The 20% WG of the toxicant showed synergistic effect in terms of toxicity. The earlier research works done previously also supported the results obtained in the present work.

The **fourth chapter** deals with the effect of pyraclostrobin on the oxygen consumption of the test fish in respiration for a period of 24 h under exposure to sublethal and lethal concentrations (1/10\(^{th}\) of LC\(_{50}\) value for 96 h). A gradual decrease in rate of oxygen was noticed throughout the exposure period.

The **fifth chapter** deals with the effect of pyraclostrobin on biochemical changes on tissues of the fish; viz., gill, liver, kidney, brain and muscle. The Glycogen, total proteins and estimations of DNA and RNA content present in the different tissues like gill, liver, muscle, kidney and brain exposed to pyraclostrobin. The fish *Labeo rohita* exposed. The biochemical changes in terms of quality were also found to be decreased when compared to control values after lethal and sublethal exposures.

The different enzyme activities such as Acetyl cholinesterase (AChE), Acid phosphatase (ACP), Lactate dehydrogenase (LDH), succinate dehydrogenase (SDH), Malate dehydrogenase (MDH), Aspartate aminotransferases (AAT) and Alanine aminotransferases (ALAT) were studied and found to be that of AChE, SDH and MDH activity were decreased when LDH, ACP, AAT and ALAT levels are elevated due to the stress of toxicity of pyraclostrobin.

The **sixth chapter** deals with the effect of haematological changes in fish *Labeo rohita* exposed lethal and sublethal of 24hr and 5\(^{th}\) and 10\(^{th}\) days. The present results clearly infer different changes seen in blood tissues and decreased Hb% content in the tissues of RBC. The tissue of WBC count is increased due to the stress
of fungicide. The PVC, MVC, MCH were decreased and the blood glucose was increased compared with serum proteins.

The seventh chapter deals with the effect of pyraclostrobin on Histopathological changes of fish tissues such as gill, live, kidney and brain. The marked degeneration changes were observed in the tissues of the fish after exposure of sublethal and lethal concentrations over a period of 24hr, 5th and 10th days. These changes were recorded in earlier work.

The results obtained in all the above studies were summarized in the final chapter.