Preface

Agriculture plays a vital role in the Indian economy contributing nearly 18% to country's GDP. In food grain production, India has achieved a fivefold increase (257.4 million tons in 2011-12) and it will be a herculean task to ensure food security for more than 1.27 bn Indian population with diminishing cultivable land resource. A number of factors take a heavy toll on the agricultural produce including insect pests, diseases, weeds, rodents etc. It is estimated that losses due to these factors account to Rs 90,000 crores as reported by the 37th Standing Committee of the Ministry of Chemicals & Fertilizers in the year 2002.

Modern industrial agriculture mainly rely on chemistry, not biology, to control pests and in doing so, it’s probably contributing to the catastrophic global decline of amphibians, a natural ally to farmers for millennia. In industrial agriculture's zeal to wipe out pests, it is helping to wipe out those pests' natural predators and this exposure to common pesticides at levels used in farm fields can kill frogs rapidly which act as good biological pest controllers. Pesticides (insecticides, fungicides, herbicides etc.) are toxic chemicals that generally undergo little to no testing on amphibians prior to their being approved for use. Unfortunately, they end up in waterways, where they live and breed. The health of amphibians is commonly used to give a rough assessment of pollution levels in an area. Conventional wisdom suggests that if an amphibian population is thriving, the area is probably clear of pollutants. Amphibians are believed to be sensitive to pollutants because of their highly permeable skins, and their varied lives, which maximize their exposure: they dwell on land and water, and eat both plants and animals at various stages of their life cycles (Vitt et al., 1990). Pesticides will contaminate soil,
water, turf, and other vegetation. In addition to eradications insects or weeds, pesticides are also toxic to a host of non-target organisms.

The present work has been undertaken to investigate the impact of imidacloprid on frog, *Hoplobatracus tigerinus*.

The present Study has been organized in five chapters.

1) The first chapter deals with the general introduction like usage of pesticides, history of chemical usage, classification of pesticides, imidacloprid persistence, environmental fate mode of action, significance of the present study and biology of the test frog.

2) The Second Chapter deals with the review of past research which helps in identifying the conceptual methodological issues relevant to the present study. This would enable the researcher to collect information and subject them to sound reasoning and meaningful interpretation. A brief review of the earlier research work related to the present study is included in this chapter.

3) The third chapter deals with the description of materials used for experimentation and methods followed for estimation of lethal dose as a part of toxicity evaluation for 24, 48, 72, 96 h, 8, 15 and 30 days. Apparatus used for the measurement of biochemical changes, residue analysis and histopathological changes were carried out with different standard methods.

4) In the fourth chapter, the results obtained in the present study for different parameters along with tables and figures for the toxicity evaluation, biochemical changes like estimation of glycogen, protein, nucleic acids (DNA, RNA) content and the changes in the activity of enzymes such as Amino-transferase (AAT,
ALAT), Acetylcholine esterase (AChE), T3, T4, TSH, residue analysis and Histopathological changes over control during toxicant intoxication to the test frog were presented and the results so obtained were discussed with the available literature.

5) The results obtained, in all, were summarized in the last chapter.

In all earnestness, the author tried her level best to make use of the available facilities to give a concise effort to study the problem undertaken. The author humbly accepts that the present investigation by no means is an exhaustive report; however, it has initiated the work to contribute the basic and useful information to the field of pesticide toxicology in relation to *Hoplobatracus tigerinus*. 