Preface

Today, man has made remarkable progress in various fields of science and technology. The every outcome of this progress which clearly reflects in the 'development' and 'advancement' has direct bearings on our natural environment. The rate, at which industrialization, urbanization and infrastructural development is taking place, no doubt indicates a spurt in development but definitely not without environmental degradation. The pollutants and toxicants released by aforesaid sectors are having hazardous effects on our bio-resources. Moreover, the impact of environmental pollution is no longer confined to local or regional boundaries; rather it extends to the global environment. In fact, today we can drink, breath, smell and see pollution.

Within the past forty years or so, man has brought the earth to the brink of ecological disasters by generating innumerable industrial and agro-chemicals. Most of these chemicals where inhaled, swallowed or administered in animal body produce deleterious effects. The increasing awareness of the environmental problems during the last two decades kindled much interest on the environmental fate and behavior of the xenobiotic chemicals. This is evident from the fact that during the last
sixteen years about twenty international journals have been launched to focus attention on environmental problems. Environmental disasters like collapse of fishery in lake and mass mortality of fish clearly established the effects of pollutants to fish and other aquatic organisms. This is the realization that the aquatic environment is the ultimate sink for all the pollutants like chemicals, pesticides, fertilizers, drugs, municipal waste, industrial wastes and agricultural wastes. Heavy metals are one of the resultants of this modern technologies emerging as major contributors to the problem of pollution in a slow and steady fashion, whose presence in higher than permissible levels in the environment can be quite hazardous. The occurrence of heavy metals in the environment and the consequent possibility of contamination of food and water is a matter of great concern. All heavy metals are potentially harmful to most of the organisms, terrestrial as well as aquatic, at some level or other, and are reported to produce toxic effects. Several reports came into light in recent years explaining that heavy metals interfere with various metabolic aspects of an organism and cause death or sublethal pathology. Contamination of aquatic environment by heavy metals not only endangers the survival of organisms inhabiting this environment, but also leads to harmful effects on
human being if the affected organisms are consumed by them. This is well established by the tragedy of ‘minamata’ disease caused by the consumption of the shellfish and finfish from minamata bay in Japan contaminated by mercury. Different heavy metals affect man at different levels. Lead could lead to the damage of brain, kidney, liver, stomach and intestine and also the nervous system. Cadmium, a nephrotoxic metal, has the tendency to accumulate in kidney. Arsenic accumulates in the liver, kidney, lungs and skin and is regarded as carcinogenic. Copper accumulates in the liver and is considered as a factor for anemia. Nickel accumulates in the spinal cord, brain, lungs and heart and is regarded as factor for dermatitis and a variety of cancers. The main source for these heavy metals causing abnormalities in human beings is the aquatic environment and the organisms inhabiting it.

Fish represents an important component of aquatic life and serve as a staple food for human beings. Many fish kills due to water pollution where reported annually to the environmental protection agency. Of these, it is note worthy to mention the massive death of fish in San Diego Harbor (USA) in 1962 where an estimated 37,800,000 fishes were killed by pollution, producing one raft of dead fish of 1000 feet long, 10 feet...
and 3 feet deep (Southwick, 1976). Cadmium, a heavy metal and its compounds have been placed on the black list of most international pollution convention by virtue of their toxicity, potential for bioaccumulation and persistence. Cadmium produces versatile biotic changes in the aquatic ecosystem. The mobility of cadmium in the aquatic ecosystem is influenced by various organic and inorganic complex agents. However, studies on the effects at different concentrations on various biochemical and histological aspects of freshwater fishes are very limited; hence it is felt essential to understand the response patterns of freshwater fishes to cadmium toxicity in order to analyze their survival, growth, health status, productivity before connecting the affected fish to human health. So, a small segment of this vast subject is examined hereby taking fingerlings of freshwater fish, Labeo rohita.

This work is only preliminary and further studies are required to attain a definitive conclusion further, there may be a few lapses in methodology and in interpretation of results, but a rigid limitation in the availability of laboratory facilities and time for completion of this work have prevented the author to penetrate into the core of the investigation, nevertheless the author is hopeful of pursuing this work further.