Summary and Conclusion
Toxicity tests using aquatic organisms particularly fish play an important role in the development of proposals for environmental management and protection, especially for the aquaculture environment. The aquatic organisms such as fish may serve as an excellent toxicity indicator of environmental toxicity in non-target vertebrates.

- Current study showed that sodium cyanide is highly toxic to the fingerlings of *L. rohita*. The 96 h LC₅₀ value obtained in the present study may be used as incipient LC₅₀ or lethal threshold concentration. The lethal concentration values imply the toxicity strength of the cyanide hence it may be used as a measure of indication of pollution in the aquatic environment.

- Cyanide intoxication had deleterious effects on the fish behaviour, making them as easy victim in the natural habitat and may affect the stability of the population. In the course of cyanide poisoning in the test species, the clinical symptoms suggest that the cyanide has profound impact on the behavioural changes in the fish.

- Present study revealed the onset of acute hypoxia under toxic stress. Despite of the regulatory capability of the fish exposed to the toxicant, the oxygen consumption rate was indeed affected. Fluctuation in the oxygen consumption rate of the fish at different time intervals could also arise as a result of respiratory inhibiting factors that come into play.

- Exposure of fish to sodium cyanide produced marked alterations in the metabolism of fish at both sublethal concentrations. Cyanide intoxication in the test animal markedly affected the metabolic activity in all the tissues of the fish studied, but the magnitude
of response varied from one organ to another with increasing treatment periods from 5 to 15 days.

- A significant decrease in the total, soluble, and structural proteins and ammonia, along with the significant increase in amino acids, urea, and protease activity and activities of AST, ALT and GDH values of cyanide exposed fish, indicates that sublethal concentrations of cyanide adversely affect the metabolic activity of fish.

- Additional decrease in levels of glycogen, pyruvate, SDH, ALP and AcP activity with a concomitant increase in the lactate, LDH and G6PDH, activity in all selected tissues under cyanide intoxication indicates the switch over of metabolic pathways towards compensatory mechanisms. This clearly represents a shift from aerobic to anaerobic metabolism as evidenced by elevated lactate and fall in pyruvate levels. These modifications may pave the way for survival of the fish in polluted habitats.

- Therefore, alterations in the metabolism of the fish reflects the differential effects of stress and can be considered as a biomonitoring tool in the assessment of environmental pollution by cyanide on non-target organisms, such as fish. Further, the liver tissue was affected to a greater extent than the muscle and gills upon exposure to cyanide.

- Subacute exposure of the fish to cyanide caused significant perturbation in ions and associated ATPase activity, which varied considerably depending on duration of exposure, their concentrations/ tissues. The observed decrease in the enzyme activity could be related to the high affinity of cyanide to sulphhydryl (-SH) groups on the
enzyme molecule, ATP depletion or disturbance of the ion homeostasis, and oxidative stress.

- It is evident from the results that the cyanide had a profound impact on the enzymes involved in energy synthesis and utilization processes and can in turn affect on the general metabolism of the exposed fish.

- The findings of the histological investigations demonstrated a direct correlation between cyanide exposure and histological changes observed in different tissues. The severity and frequency of lesions are more pronounced on the 10th and 15th day of exposure in both the organs.

It is concluded that cyanide poisoning can induce changes in the respiration, behavioural physiology, biochemistry and histological changes in the fish. Thus the toxicity results obtained could be used to study the adverse effects of toxicants on fish and other aquatic animals. The above analogy also warrants for an indispensable need to evaluate more toxicity data for wide range of animal groups of the eco-web in order to understand broad spectrum of cyanide in comparison to other chemicals available. Present study also provides a base line data to establish tolerable limit and safe level of toxic agents for the biota of aquatic environment. The reported results would be a useful contribution in the ecotoxicity risk assessment studies of cyanide on fish species. Owing to the high toxicity of cyanide it is strongly recommended to handle it carefully using all necessary precautionary measures so that its harmful effects on the aquatic life can be minimized.