PREFACE
Industrialisation, urbanization, population explosion, green revolution etc., have resulted in many fold changes in the environment as well as ecological balance. These changes have been experienced by human beings and other organisms for the last several years and resulted in manifestation of alterations in their behaviour and physiological functions.

Environmental conditions in India are greatly influenced by air, soil and water in urban and rural areas mainly due to rapid industrialization. Trace elements are essential and beneficial for human health at minute concentrations but exert toxic effects if their concentration exceeds the permissible level. Certain trace elements such as lead, arsenic, aluminium, cadmium or fluoride are considered toxic to man and animals.

Flouride is ubiquitously found in the environment and due to its reactivity it rarely occurs in the element state in nature. It exists instead, as ionic fluoride. Rocks, soil, water, air and plants all contain fluoride in widely varying concentrations. It enters the body by ingestion and inhalation and in extreme cases of acute exposure through the skin. Exposure to fluoride in doses beyond 1 ppm (maximum permissible), results in skeletal and dental fluorosis. One of the serious health problems facing India today is prevalence of fluorosis in 17 states involving a population of about 62 million. India’s earth crust is rich in fluoride containing minerals. Fluoride is present in ground water, a major source of drinking water in most Indian villages and in some food stuffs. It has been estimated that fluoride levels in water in India ranges from 2-
39ppm. Knowledge about the effects of fluoride in human beings, animals and plants is important in view of the danger of fluoride pollution of the natural environment.

Fluoride readily penetrates all membranes by simple diffusion. In our body, it is stored not only in bones and teeth, but in every organ and under certain conditions, it can affect virtually every phase of the human metabolism. The toxicity of fluoride compounds administered orally differs from species to species. Considerable attention has been paid in studying its effects on hard tissue, but relatively less information is available on soft tissue interrelationship with fluoride. Besides this, the search for an agent(s) which could help in the amelioration of fluoride toxicity is essential to be worked out.

In view of the fluoride toxicity in human populations from endemic areas in India, the present study was an attempt to evaluate the effects of fluoride on the structure and functions of some male reproductive organs, viz., testis, caput and cauda epididymides, vas deferens, and some other tissues like muscle, liver, kidney as well as serum. The possible therapeutic effects of administration of vitamins C, D, E, calcium, amino acids (glycine and glutamine) alone as well as in combination and protein supplementation for mitigation of fluoride toxicity was also investigated during the tenure of the study.

The investigations carried out revealed that fluoride affects the structure and functions of some organs of male mice. Several metabolic alterations were observed viz., altered protein levels, changes in energy and carbohydrate metabolisms, hampered steroidogenesis and disturbed nucleic acid metabolism, thus rendering the
tissue susceptible to injury with increase in lipid peroxides and decline in superoxide dismutase. The sperm functional parameters were also altered. These changes caused reduction in fertility in experimental animals. However, these fluoride induced effects were to a significant extent, recovered to nearly normal state in almost all parameters after withdrawal of treatment and ingestion of antidotes. Interestingly, administration of vitamin C and calcium individually and in combination, vitamin E and/or vitamin D and amino acids (glycine and glutamine) as well as protein supplemented diet were found to suppress fluoride toxicity more effectively.

From the above findings it is evident that NaF induced effects are by and large, transient and reversible. The present studies have shown that dietary factors such as vitamins, amino acids and protein supplementation could ameliorate the toxic effects of fluoride.

Thus, the present investigation is a significant contribution to the existing knowledge in the field especially in understanding the detailed effects of fluoride toxicity in animals and towards amelioration of fluoride induced health hazards the world over.

The thesis consists of Chapter I which is general Introduction and Review of Literature. Chapter II includes the various Materials and Methods employed. Chapter III incorporates the Results, while in Chapter IV the Results obtained are discussed in the light of earlier work in the field. Chapter V has Summary and Conclusions and some future lines of work, which could be undertaken. At the end, a Bibliography in alphabetical and chronological order is given.
PAPERS PUBLISHED


ABSTRACTS PUBLISHED AND SEMINARS/CONFERENCES ATTENDED


