PREFACE
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Man, for his existence on the earth and the desire to perform better and better with respect to production of food, energy and convenience products, in order to improve the living standards, has exploited nature in various ways. He has not only extracted materials from the nature, but also made a variety of synthetic chemicals which were unknown earlier. The increasing use of different chemicals in our day to day life has resulted in an overall degradation of human life. Sometimes, the accidental release or overdose of chemicals, which are otherwise safe in usual concentrations, can result in death or acute and chronic effects on human health.

Any change in the composition of the environment which directly or indirectly affects the human is considered pollution. This increasing pollution of the environment has made the life of mankind miserable on the planet. Pollution can be caused by discharge of the pollutants in the environment by natural or man-made activities. Industrialization, agriculture, automobiles, growth of human population and destruction of natural resources are some important factors responsible for increasing pollution in recent days. These factors can impose stress and trigger tissue damage by numerous bio-chemical and cellular mechanisms. Some such chemicals viz., arsenic, fluoride, aluminium, chromium, mercury, lead, nickel etc., if taken beyond permissible limits can prove to be toxicants. The main objective in undertaking this work was to study:
1. The effects of sodium fluoride and arsenic trioxide alone and in combination
\textit{in vivo} on the reproductive organs (ovary and uterus) of female mice and \textit{in vitro} studies on peripheral blood lymphocyte cultures for assessment of genotoxicity.

2. To study the effects of withdrawal of treatment \textit{in vivo}.

3. To investigate the possible therapeutic effects of calcium, vitamins C and E administered alone and in combination \textit{in vivo} and the protective effect of vitamin C against fluoride and arsenic toxicity \textit{in vitro}.

One of the major public health problems which India is facing today is fluorosis - a disease caused by high fluoride intake. As a result, many people have become paralysed and many have developed permanent deformities which forces them to live a vegetative life. Fluoride toxicity is not only confined to the skeletal tissues but its harmful effects on central nervous system, gastrointestinal tract, liver, kidney, cardiovascular, respiratory, reproductive systems and muscle are also known. Though there are various sources of fluoride intake, drinking water accounts for 60\% of the total intake.

While on adequate water supply is one of the basic needs of all human beings, there are many barriers to fulfilling this need in various parts of the world. The pollution of groundwater by arsenic is one such barrier which has been identified in some developing countries of South and Southeastern Asia as well as Latin America. Clinical investigations such as hyper-keratosis of hands and feet, pigmentation on the
trunk, skin ulceration, high prevalence of cardiovascular disease, neurotoxicity, cancers as well as Bowen’s and Blackfoot diseases increased with the arsenic content of well water. It is necessary to assess the risk of arsenic exposure because it is one of the most abundant elements of the earth’s crust. Present knowledge on the toxic effects of arsenic are rather sparse, and work should be carried out in this direction.

Combined arsenic-fluoride poisoning is an exceptional disease in the world. In most cases, this problem arose when deep wells were installed to avoid the use of surface water which could be contaminated with biological pathogens. Due to this reason, after the 1970s, endemic fluorosis and arsenism appeared among the residents in some parts of the world.

Several investigators have studied arsenism and fluorosis individually and the results indicate that both arsenic and fluoride cause injury to reproductive organs and cytogenetic alterations. However, studies on the combined effects of fluoride and arsenic on cytogenetic changes and reproductive physiology, especially by low doses and long term conditions have not been reported. Therefore, the present study was undertaken to investigate the effects of combined arsenic and fluoride intake on ovary and uterus in vivo as well as their effects on human lymphocyte cultures in vitro.

Besides this, the search for an agent(s) which could help in the amelioration of arsenic and fluoride combined toxicity is essential to be worked out. Therefore, to bridge these gaps, calcium and some antioxidant vitamins, C and E were used as therapeutic agents alone or in combination in this study.
The thesis consists of Chapter I which is general Introduction and Review of Literature, Chapter II deals with the various Materials and Methods used. Chapter II presents the Results of the study while in Chapter IV the results obtained are discussed in the light of earlier work. Chapter V contains the Summary and Conclusions. At the end, a Bibliography is given in an alphabetical and chronological order. Some future lines of work are also indicated which could be undertaken to fill the lacunae in the field.

CONFERENCES ATTENDED/ABSTRACTS PUBLISHED


mitigation by vitamin C. XX National Symposium on Reproductive Biology and Comparative Endocrinology, Department of Animal Science, Bharathidasan University, Tiruchirappalli, January 7-9, 2002, pp.94, Abstract No.RT-P-9.