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spite of the fact that more and more people today live longer, healthier and more productive lives than at any time in history, yet the gains have been inadequate and uneven. More than a billion people still live in abject poverty. To reduce poverty, sustained and equitable economic growth is essential. But past economic growth has often been associated with severe degradation of the global environment. On the surface, there appears to be a trade off between meeting people's needs which is the central goal of development and protecting the environment. Sustainable development is the one which lasts. A specific concern is that those who enjoy the fruits of economic development today may be making future generations worst off by excessively degrading the earth's resources and polluting its environment.

Water provides an example of an undervalued renewable resource that is showing signs of shortage. These shortages emerge when water is lost or wasted because its true value is not recognised.

Access to safe water remains an urgent human need in many countries. Part of the problem is contamination of ground water resources. Human welfare is reduced by ill health and premature mortality caused by degradation of water quality. Pollutants can cause health problems through direct exposure or indirectly through changes in physical environment. Fluoride is one such geochemical contaminant which is widespread and ubiquitously present all over the world.

The general abundance of fluoride in fresh water is between 0.05 to 1.00 mg/L. But depending upon the water quality and its characteristics like pH, temperature and bearing capacity of soil, the levels are varying considerably. Fluoride occurs
throughout the world in soil, plant, water and even in the air which we breathe. Although it is beneficial when present in concentration of 0.8 - 1.00 mg/L, it has been associated with mottled enamel of teeth when present in potable waters in concentrations in excess of 1.5 mg/L. Skeletal fluorosis has been observed at concentrations beyond 3 mg/L. Although several sources are there, 60% of total fluoride intake comes through drinking water.

Endemic fluorosis is a known crippling public health problem which is characterised by weight loss, weakness, anaemia, brittle bones, stiff joints, aching backs etc. The effects of fluoride on skeletal and dental systems are very well documented. But there is a paucity of data regarding soft tissue effects and proper defluoridating methods.

A large fraction of human population are exposed to a variety of chemicals during their life due to deterioration of our ecosystem. Prolonged exposure to many toxicants have been found to alter the status of sensitive and complex mechanisms of our body. Therefore, it is essential to evaluate the toxicity of fluoride by taking into consideration various organs like kidney, liver and gastrocnemius muscle, their functions and metabolism. Apart from toxicity studies, it is also important to find out proper ameliorating agents for appropriate treatment against fluorosis.

During the course of this work, efforts were made to investigate the effects of fluoride on.

(i) The haematology of albino male mice.

(ii) Liver and kidney functions of albino male mice with special reference to carbohydrate metabolism and electrolyte balance.

(iii) Fluorotic human subjects of endemic regions of North Gujarat i.e. Banaskantha and Mehsana districts.

In addition to this, attempts were also made to develop a simple defluoridation
unit and its mass-balance relationship.

The thesis contains chapter I, which is General Introduction and review of literature. Chapter II consists of Material and Methods used. Chapter III incorporates Results, while in Chapter IV the results obtained have been discussed in the light of earlier investigations. 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 presented.

The investigations carried out during the tenure of this thesis revealed that fluoride affects the structure and functions of kidney, liver and muscle. Sodium fluoride did not affect some haematological parameters. But electrolyte balance was disrupted. As a result, water balance of the whole body would be disturbed. Reduction of protein in all the organs was related to reduction in growth and fall in bodyweight.

The survey carried out in 53 villages of Mehsana and Banaskantha districts revealed high amount of fluoride in their drinking water. Due to consumption of high fluoride containing water, the serum also exhibited elevated fluoride levels. As a result, the soft-tissue functions were found to be affected as evidenced by alterations in Haemoglobin, glucose (Blood), SGOT, SGPT (liver function), catecholamine levels (adrenal), T₃, T₄, TSH (thyroid), Na⁺, and K⁺ and Ca²⁺ (kidney) levels. Therefore, preventive measures by defluoridation of drinking water should be undertaken, since ground water contamination is often found to be prevalent. It is concluded that these studies have important implications in the fluoride endemic regions and human welfare, since 15 states in India have been found to be under the threat of fluorosis.

These investigations are useful contribution in understanding fluoride effects on soft tissues as well as in undertaking preventive measures.
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