

Research Paper :

Fluoride in drinking water : A challenge to public health

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ABSTRACT

The menace of high fluoride concentration in ground water resources has now become one of the major health related geo environmental issues in many countries of the world. Our country is also confronting the same problem, where the high fluoride concentration in ground water resources and the resultant disease "FLUOROSIS" is widely distributed in nearly 150 districts of 15 states. In Madhya Pradesh during recent years, the problem of fluoride has reached an alarming proportion. The continued consumption of fluoride in excess to 1.5 mg/l either through water, air or food items for a long time may cause dental, non-skeletal and skeletal fluorosis. If it is significantly high in drinking water, it may cripple one for whole life. Fluorosis is one of the incurable diseases and perhaps, the prevention is the only known solution. Today, it has posed serious adverse health effects in many parts of the Indian union. In this paper it is attempted to identify its sources, impact on human health and to develop a strategy to tackle fluorosis in the country.

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Water is prime natural resource and physiological necessity to mankind. Therefore, drinking water must not carry harmful chemicals as well as biological contaminants. Some of the chemicals like fluoride, iron, arsenic, cadmium, chromium, lead, selenium and nitrates in water are not known to be beneficial. On the contrary, they may produce serious, adverse physiological changes when exist beyond permissible concentration. Fluoride is one of such chemicals, which has posed a great threat to human health in the country. Fluoride is major contaminants of the ground water in many parts of India. About 25 million people are affected with fluoride toxicity today. Fluoride is widely dispersed in nature, and is a common constituent of most soils, rocks, plants and animals. First-ever case of fluorosis was detected by the farmers of Andhra Pradesh State among cattle (bullocks used for ploughing land) during early 1930's. Sharatt *et al.*, 1973 published the first report of endemic fluorosis in India. Since then endemic fluorosis has been identified in 17 states of the Indian union and is known to be prevalent for the last six decades without receiving much attention to tackle it. In 1994, a National survey of drinking water in India indicated that over 43.5 million people living in 1.42 lakh habitations spread over 200 districts are at health risks due to water quality problems and fluoride was identified as one of the major contaminants.

Due to its high electro negativity, it forms only fluorides and no other oxidation states are found (Hem, 1992). It is essential to maintain fluoride concentration between 0.6 to 1.2 ppm in drinking water (ISI 1983 and WHO, 1994). The water is naturally fluoridated due to

the earth's crust being rich in fluoride bearing minerals (Sushella and Ghose, 1990). The National drinking water mission was launched in 1986-1987 (Ministry of Rural Development, 1993) and under this mission defluoridation technique has been developed but still many areas are in dire need of attention from the authorities. Nawlakhe *et al.*, 1995 reported ground water quality of rural areas in Shivpuri district of Madhya Pradesh, India and observed fluoride and nitrate to be the problem parameters in order of dominance. Choubia *et al.*, 1995 studied the presence of fluoride in Dungarpur district of Rajasthan. They reported that maximum number of domestic water sources have high fluoride contents. Kataria *et al.*, 1995 studied bore well water quality in BHEL area of Bhopal with reference to nitrate, nitrite, fluoride. The pollution of the water has extremely serious implications.

Somashekar *et al.*, 2003 have investigated ground water potential and fluoride levels in the water of Hosadurger, Taluk, Karnataka, (India). Khoshoo, 1989, Kortin, 1979, GCDWK, 1979, Pathak and Badre, 1999, Rao and Venkateshwarulu, 2000 also studied the effect of fluoride on human health.

In this paper an attempt has been made to compile the information on the matter available elsewhere in the literature and experience gained for developing a strategy.

Occurrence :

Fluoride occurs significantly in rocks, plants and crops, drugs, industrial processes etc.