

Analysis of fluoride concentration in groundwater in and around Bhopal City, M.P. India

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(Received: July 20, 2008; Accepted: October 21, 2008)

ABSTRACT

Determination of fluoride concentration of 15 groundwater samples from different sites in and around villages near Bhopal city was carried out by using selective fluoride ion-electrode. The outcome of the results were discussed in the light of pollution status fluorosis in school going children (infants) because they used different sources of drinking water of different sites and they are being exposed to used drinking water from several points and types. In the present study fluoride has varied from 0.12-0.99, 0.10-2.1 and 0.14-2.5 mg/L in groundwater of Bhopal and nearby villages of Gandhi Nagar area of Bhopal some cases of fluorosis are also noted in certain areas of Bhopal region.

Key words: Determination, Fluoride Ion concentration, ground water, exposed, fluorosis.

INTRODUCTION

The quality of ground water depends to a large extent on the effects of land use patterns, types of aquifer and the permeability of soil cover of study area. Due to rapid growth of urbanisation and industrialisation much sewage is disposed off that has generated fair chances of groundwater pollution by percolation and infiltration of sewage water mixing into water sources. The deterioration in groundwater quality and due to industrial effluents and supply of water from low-depth (Shallow) bore-wells. Hence it becomes necessary to monitor the groundwater continuously to assess the fluoride concentration.

Fluoride concentration in India, creates health problems and fluorosis. The disease previously called as "mottled teeth" reported in Madras City (1933). Most of the population of 18

states out of 35 States in India are well affected with dental, skeletal and non-skeletal fluorosis, which Southern India is badly affected by "Fluorosis". Fluoride in drinking water is 1.0-1.5 mg/L recommended by WHO (2004).

Bhopal is the capital of Madhya Pradesh covers an area of 2.79 lac h. of 16.8 lac population.

Fluoride concentration has analyzed by using ion selective Electrode and ORION 407A meter followed by standard as prescribed by APHA (1992). The water samples was preserved by adding total ionic strength adjustment Buffer (TISAB) in 1:1 ratio and analyses for fluoride levels using electrode. Actual fluoride levels is calculate by standard curve plotted on a semilog graph conc. (Log axis) vs mV. Teofia and Teofia index (TTI 1991) has commonly used to score dental fluorosis in several endemic areas of this country.

Table 1: Fluoride concentration in drinking water of Gandhi Nagar area of Bhopal (2007-08) in mg/L

S.No	Winter	Summer	Monsoon
1.	0.12	0.20	0.024
2.	0.30	0.32	0.040
3.	0.10	0.50	0.38
4.	0.90	0.80	0.60
5.	0.78	0.66	0.74
6.	0.40	0.48	0.54
7.	0.60	0.64	0.98**
8.	0.40	0.90	1.0
9.	0.80	0.10	0.14
10.	0.70	0.60	0.65
11.	0.60	0.59	0.90
12.	0.68	0.76	1.10
13.	0.76	0.88	2.5**
14.	0.99**	2.0	1.90
15.	0.64	1.72	1.60
16.	0.50	1.2	1.42

W.H.O. Standard 0.6-1.0 mg/L, Limits by Ministry of Health & Family Welfare (Delhi) 1.0-2.0 mg/L.

(1) Nai Basti (2) Peepalner (3) Gondar Mau (4) Tagore Ward (5) Shivaji Nagar (6) Pratab Ward (7) Abbas Nagar (8) Gondipura (9) Kabirham (10) Jatkhedi (11) Parvalia Sadak (12) Jharkheda (13) Near Air Port (14) Intitute of Aeronatutics (15) Village Jhiranaya (16) Sonkaccha Village.

In the present study fluoride observed in the range of 0.12-0.99, 0.10-2.1 and 0.14-4.2 mg/L. in winter, summer and monsoon (W, S and M) season in bore-wells water of Gandhi Nagar area of Bhopal. The results are summarized in Table 1. Fluoride concentration in water may results in substantial reduction in dental carries of children adults. Requirement and recommended limits of fluoride as per ISI: 10500 (1983) in range of 0.6-1.2 mg/L.

Fluoride has little significance in industrial water. Amount of 1 to 1.5 ppm is an effective preventive of dental carries. Above this amount fluoride may causes dental fluorosis. Such water may be defluoridated to reduce the fluoride concentration before public use. The values obtained are well below the permissible limits 1ppm as prescribe by ICMR excepts some of the sampling stations the values are found beyond the limits at SS₁₂ To SS₁₅.

Some important workers has contributed their studies on fluoride are pandit, C.G. *et al.*, (1940). Handa (1975), Dhainsa *et al.*, (1984), Dwarkanath *et al.*, (1991), Gupta *et al.*, (1993), Kataria (2004), Thombal, D.U. *et al.*, (2008) and Tripathi *et al.*, (2008).

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