



CONCENTRATION OF FLUORIDE IN GROUNDWATER SAMPLES IN NANDED DISTRICT MAHARASHTRA (INDIA)

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Abstract:

The present investigation deals with the results of analysis of Fluoride and other water quality parameters of groundwater from various samples sites of Nanded district. The findings reveal the fact the concentration of Fluoride was very high when analyzed and which is not used for drinking purpose. Due to the high concentration people may affected from fluoride poisoning and lead to fluorosis in animal and resident of many people.

Key words: Fluoride, groundwater, fluorosis

Introduction:

Fluoride is an essential element for human and animal health particularly for prevention of dental caries. But high fluoride content in drinking water gives rise to harmful effects in human beings and animals. Fluoride deficiency, on the other hand may have a harmful influence on the growth of teeth (A.K. Susheela, 2001). Fluorosis is a kind of disease caused by consuming excessive amounts of fluoride i.e., above 1 ppm fixed by ICMR, (1975). However with identical concentrations of fluoride in water, variations in the incidence of the disease. (Eagners, 1996) have been noticed. Thus, it is related to other chemical constituents (SMEW, 1985) (Trivedy and Goel, 1984) of drinking water which is protective against the development of fluorosis such as magnesium, calcium and total hardness. After eruption of the teeth, the fluoride content of drinking water has no visible effect on the enamel even though the fluoride content of the teeth increases for analysis, the samples of water were collected from different places are located in Nanded district were investigated.

Material and methods:

Samples of drinking water from all the available sources of the selected areas were collected in polythene bottles. The total number of water samples collected from all these areas put together was 10. The bore wells in the areas were about 100 – 600 feet in depth. All

the samples were analyzed for various parameters (Kochhar and Dadmal, 2004). Fluoride was analysed by Spectrophotometer. Total alkalinity, total hardness, calcium, magnesium and fluoride were determined by usual titration methods. pH of the water samples was measured by using pH meter. Electrical conductivity of the water samples was measured by using Conductivity Bridge.

Results and discussion:

The concentration of natural fluoride in ground water is not uniform in these areas. The fluorotic variation is due to many factors such as sources of water, the geological formation of the area, the amount of rain fall and the quantity of water lost by evaporation. The parameters e.g., pH, alkalinity, calcium, magnesium and chloride which are enhancing fluoride toxicity. NRCF, (1971); Rao et al., (1975). Table-1 gives the findings of the concentration of fluoride and other parameters in ground water samples. In the water samples of these areas, PH, ranged from 6.39 to 8.34. The electrical conductance ranged between 511 and 2448 mho/cm. Total hardness and chloride were ranged from 270 to 3600 ppm and 32.02 to 2352.08 ppm. The total alkalinity of these samples ranged from 96.21 to 288.63 ppm. The lowest concentration of fluoride was recorded 2.1 to 1.5 ppm in Khandhar bore well and Vaibhav nagar Nanded, Himayat Nagar borewell & Lahan In umri Venketesh Nagar & Taroda naka borewell. The highest concentration of fluoride 4.1 to 3.1 ppm was recorded in Yelegaon Sugar factory, Nanded, Bhokar, Near busstand, borewell & ITI Nanded borewell. The values of fluoride concentration decreases, this is due to the leaching of fluoride from the rock soil to the ground water. When fluoride toxicity increases, the percentage of people affected by fluorosis is also increases.

Table-1: Physico-chemical Parameters in Groundwater Samples

Sr. no.	Description of source	Fluoride (ppm)	pH	EC (mho/cm)	Total Alkalinity (ppm)	Total hardness (ppm)	Calcium (ppm)	Magnesium (ppm)	Chloride (ppm)
1	Khandhar Borewell Z.P.High school	1.5	7.21	1079	267.25	1860	1500	360	1717.49
2	Umri, Venketesh nagar, Public borewell	2.3	7.47	1423	160.35	3420	1900	1520	2352.08
3	Yelegaon Sugar factory, Nanded	4.1	7.56	1280	256.56	3600	2800	800	2084.28
4	Taraodanaka, Near Borewell	2.1	7.91	738	181.73	800	550	250	1210.97
5	Himayat nagar, Public bore well	1.5	8.01	741	160.35	970	720	250	1251.73
6	Bhokar, Near busstand, borewell	3.4	7.83	1080	235.29	270	190	80	43.66



Sr. no.	Description of source	Fluoride (ppm)	pH	EC (mho/cm)	Total Alkalinity (ppm)	Total hardness (ppm)	Calcium (ppm)	Magnesium (ppm)	Chloride (ppm)
7	Vaibhav Nagar, Nanded borewell	1.5	6.70	2448	224.59	330	240	90	305.65
8	Lahan Grampanchayat, Nanded, bore well	1.6	6.68	1278	213.90	360	290	70	32.02
9	Loan, Nanded borewell	1.6	6.78	936	235.29	300	240	60	32.02
10	ITI Nanded borewell	3.1	6.39	1546	256.68	550	410	140	419.18

Conclusion:

The fluoride in ground water was found to be maximum 4.1 to 1.6 ppm. The percentage of people affected by fluorosis also increased in high percentage. Therefore fluoride in water drawing from deep bore wells from the areas to the interior parts influence fluorosis. Hence it is obvious that nature of depthless of bore well is a factor for fluorosis.

REFERENCES

- A.K. Susheela, (2001).** A Treatise on Fluorosis, Delhi, 53
- ICMR, (1975).** Indian Council of Medical Research, Manual of Standards of Quality for Drinking Water Supplies, 74
- ISI, (1991).** Indian standard institute, drinking water specification
- K.V. Rao. A.K. Khandekar and D. Vaidyanadhan, (1975).** *Indian J. Exper. Bio*, **11**, 68
- N. Kochhar. and V. Dadmal, (2004).** *Surv. Ind. SP. Publ*, **83**, 293
- National research council fluorides, (1971).** National Academy of Sciences,
- R.K Trivedy and P.K Goel, (1984).** Chemical and Biological Methods for Water Pollution Studies, Environmental Publications, 215
- R.Y. Eagners, (1969).** Toxic properties of inorganic fluorine compounds, Elsevier publishing company Ltd., 4 4. WHO, Fluoride and human health, 59
- Sheila Srivastava and Shiv kumar, (2010).** *RASAYAN J. Chem*, **3(3)** 411
- SK. Maiti. (2004).** Hand book of methods in environmental studies, ABD publishers,
- Standard methods for the examination of water and waste water, (1985).** American public health association and water pollution control federation, Edn.16, 156
- WHO, (1970).** Fluoride and human health, 59