

Analysis of Fluoride Concentration at Villages of Pindra Tehsil of Varanasi District (U.P.) India

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ABSTRACT

Concentration of fluoride in drinking water should be within permissible limit as prescribed by organizations like ICMR, WHO, BIS. Potable water containing high concentration of fluoride ions causes fluorosis and mottling of teeth. Fluoride ions enter in ground water from geological formation. The absence or very low concentration of fluoride ions causes mottling of children's teeth. So it is very crucial to find out the fluoride content ion in water used for drinking purposes. In present study, fluoride ion concentration is determine by standard analytical procedures and found in the range from 0.2 to 1.6 ppm at different sampling points of Pindra Tehsil in Varanasi district during May, 2018 to July, 2018.

Keywords: Drinking water fluorosis, mottling of children teeth.

Introduction: Water is basic need of the living system on earth. It is essential not only for humans but also for animals, plants and other living organisms. Only 0.3% of total water of earth is available for human use. The purity of the drinking water should be of high quality and its constituents are required for human health under a certain prescribed limit. For the present study the Pindra Tehsil of Varanasi district of U.P. is chosen and sample were collected, analyzed for only fluoride ion concentration. In this area bore well water is major source for drinking purposes [1]. Fluoride ingested with water is almost completely absorbed and distributed rapidly throughout the body, with main retention in the bones and small portion in teeth[2]. Recommended value of fluoride ion according to WHO is 0.5 to 1.0 ppm [3].

Material and Method:

In present study to access the fluoride content in drinking water samples collected from different sampling sites of Pindra Tehsil, of Varanasi district from May, 2018 to July, 2018 details of which are given in Table No.1

Table No.1
Details of Sampling Points

SN.	Locality	Sampling Stations	Owner of the Bore-well
1.	Pindra Tehsil	PIN1	Govt.
2.	Babatpur Railway Station	PIN2	Govt.
3.	Ashapur	PIN3	Ram Azor
4.	Balrampur	PIN4	Harinath
5.	Badagaon	PIN5	Sajjan Yadav
6.	Bhagwanpur	PIN6	Kailash Rajbhar
7.	Buchi	PIN7	Ramadhaar Yadav
8.	Garthma	PIN8	Suman Singh
9.	Harinathpur	PIN9	Santoshi
10.	Koiran	PIN10	Sabhapati Maurya

Water sample of bore-wells were collected from above mentioned sampling stations of Pindra Tehsil and determined fluoride ion by zirconium Alizarin-Red S method. In the acidic medium zirconium reacts with Alizarin Red-S to form complex, which is bleached on the addition of fluoride ions and colour changes from red violet to yellow green [4]. 20 ml of filtered sample is taken and sodium arsenite solution is added to remove residual chlorine. 5 ml of zirconium alizarin solution added to the standards and samples solution mixed well immediately and measured the absorbance after 20 minutes at 520 nm.

Result and Discussion: The result of analysis of fluoride ion content of water samples of bore-wells of Pindra regions of Varanasi district are given in the Table 2. From the table the fluoride content ranges from 0.3 to 1.8 ppm at different sampling stations. In the present study, fluoride concentration is found within the prescribed limit except PIN1 and PIN2. Apart from rock forming mineral which on weathering can contribute to the fluoride content in ground water the use of phosphoric fertilizer [5-8] as well as decaying bones of dead cattle in agriculture and industrial effluent can enhance the concentration of fluoride.

Table No.2
Fluoride concentration of different borewells

S. No.	Sampling Stations	May -2018	June-2018	July-2018
1.	PIN1	1.79	1.97	1.91
2.	PIN2	1.97	1.94	1.46
3.	PIN3	0.40	0.36	0.33
4.	PIN4	0.47	0.47	0.56
5.	PIN5	0.78	0.81	0.83
6.	PIN6	1.36	1.19	1.22
7.	PIN7	0.37	0.43	0.50
8.	PIN8	0.70	0.84	0.78
9.	PIN9	0.79	0.69	0.70
10.	PIN10	0.78	0.79	0.81

Fluoride Ion Concentration in ppm

Concentration of Fluoride ions in Differnet Months

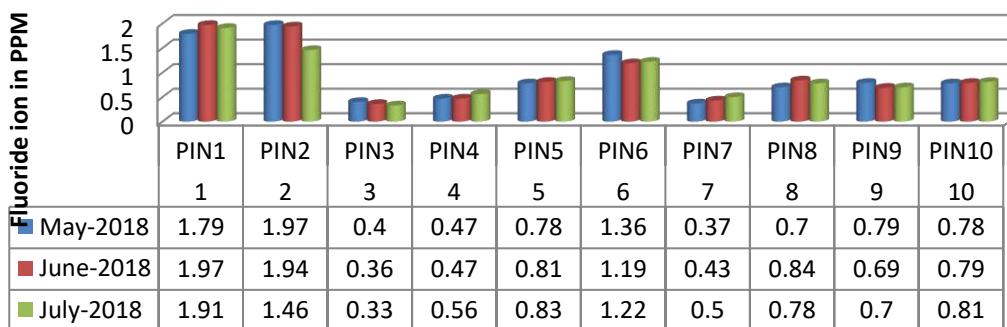


Fig.1 Fluoride Concentration

Conclusion: From figure 1, it is clear that concentration of fluoride at PIN1 and PIN2 and PIN6 were higher than other selected sites and crossed the maximum contamination limit. At other places concentrations varies around optimum level of human intake. At PIN1 and PIN 2 results are expressing that continuous use of water from these site will cause serious effect caused by high fluoride contaminations.

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