

## ANALYSIS OF FLUORIDE CONCENTRATION IN THE WATER OF BORE-WELLS OF SEMARIYA VILLAGE AT SATNA DISTRICT , M.P., INDIA

Laxmi Agnihotri <sup>1</sup>Sushma Singh<sup>2</sup> ,Manoj Kumar Sharma<sup>3</sup>

1, 2,3 Department of Chemistry, Basic Science.

AKS University, Satna M.P., India 485001

### ABSTRACT

In drinking water concentration of fluoride should be in requisite amount, excess amount of fluoride in drinking water causes dental fluorosis, mottling of teeth. while less concentration of fluoride in ground water results in a high incidence of dental caries, in children's teeth.

Umariya district is famous for coal mines and stone, fluoride ions dissolved in ground water from geological formations, so it becomes very important to analysis the fluoride in water of bore-wells for used drinking purpose in Satna city, in this analysis evaluation of fluoride concentration done by standard analytical procedures and found 0.79 to 0.689 ppm at different sampling station of umariya city during November 2017 to April 2018.

**Key words:** - Ground water, Fluorosis, Mottling of teeth

### **Introduction:-**

In our environment water is important for existence of life. All the living creatures depend on water in one way or the others but there are instances that civilization have disappeared due to shortage of water or due to water born diseases. Today water has become essential commodity for the development of industries and agriculture. in general surveys reveals that total surface area of earth is about 51.00 crore sq. kilometer out of which 36.01 crore sq. kilometers covered by sea, addition to this we get water from rivers, lakes, tanks and snow in hills about 15.00 crore cubic kilometer of water is also found on the average layers of the earth. Although it is surprising but true that in spite of such abundance there is very little soft water in the world which become very precious and scare mainly due to the increase in human population and fast development. The

inadequate and irregular water supply through piped water system has forced the population to use whatever quality of water available in nearby water source; this often leads to water borne diseases and other serious health hazard. it is therefore essential to monitor the water supply as well as quality of water. Specially, the fluoride content in water above permissible limit causes dental Fluorosis, skeletal fluorosis and other serious teeth disorders. The optimum fluoride concentration in water protects teeth from decay without causing remarkable Fluorosis, fluoride ingested with water is almost completely absorbed and distributed rapidly throughout the body with main retention in the bones and a small portion in the teeth. The aquifers which are deeper contains high fluoride up to 1.33 PPM [1,2] while the value of 0.5 to 1.0 PPM has recommended by WHO [3].

### Material and Methods:-

In this study attempts were made to assess the fluoride content in drinking water samples collected from various sampling stations of umariya city of M.P. during November 2018 to April 2019 the detail of which are given in the table.

#### Details of sampling stations

| Sr. No. | Sampling Station | Owner of the Bore well         |
|---------|------------------|--------------------------------|
| 1       | SM 1             | Mr.Nandani Prasad<br>Agnihotri |
| 2       | SM 2             | Mr.Ashok Agnihotri             |
| 3       | SM 3             | Mr. Ram Mohan Pandey           |
| 4       | SM 4             | Mr. Ajay kumar Singh           |
| 5       | SM 5             | Mr. Umashanker Gautam          |
| 6       | SM 6             | Mrs Champa Agnihotri           |
| 7       | SM 7             | Mr. Shriram Sharma             |
| 8       | SM 8             | Mr. Rajesh Sharma              |
| 9       | SM 9             | Mrs. Gayatri Devi              |
| 10      | SM 10            | Mr.Om Pandey                   |

Water samples of bore wells were collected from above mentioned sampling station of umariya city by using standard sampling procedure. The samples were collected during November 2017, January 2018 and April 2018 and simultaneously analyzed for their fluoride concentration.

In acidic medium Zirconium react with Alizarin red-s to form violet complex, which is bleached on the addition of fluoride ion and color change from red violet to yellow green [4] 100 ml of filtered sample is taken and sodium arsenate solution is added to the filtered samples then 5 ml of Zirconyl acid solution was added to it for the removal of  $SO_4^{-2}$  interference followed by the addition of Alizarin red-S, now wait for at least one hour measured the absorbance at 570 nm filter and calculated the concentration with the help of standard curve the above mentioned analytical procedure is followed as prescribed by APHA[5,6]

### Result and Discussion :-

The result of analysis of fluoride content in water sample of bore well of umariya city are summarized in table-2.

**Table-2**

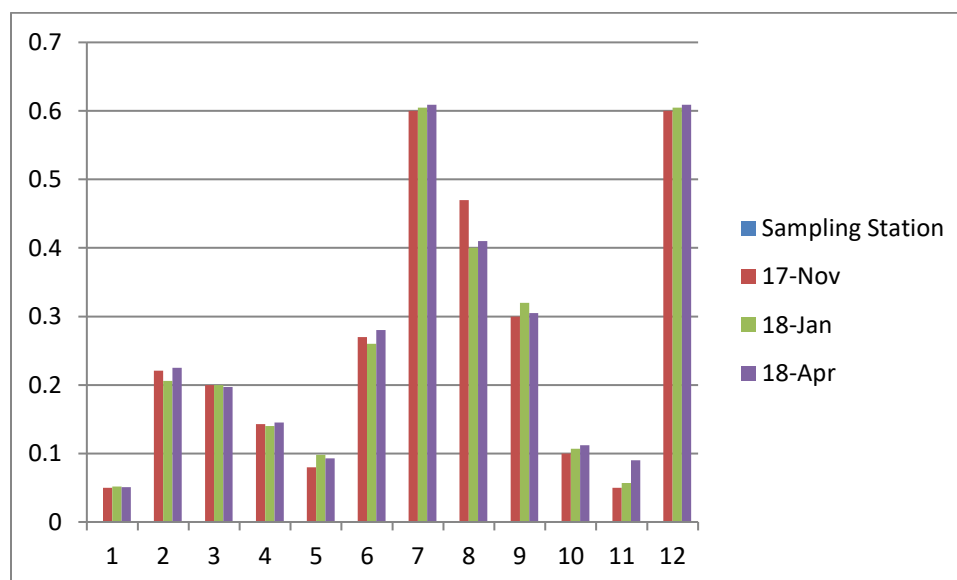
#### **Fluoride Concentration of different borewell**

| Sr. No. | Sampling Station | November 17 | January 18 | April 18 |
|---------|------------------|-------------|------------|----------|
| 1       | SM1              | 0.051       | 0.053      | 0.052    |
| 2       | SM 2             | 0.224       | 0.203      | 0.221    |
| 3       | SM 3             | 0.201       | 0.202      | 0.198    |
| 4       | SM 4             | 0.141       | 0.143      | 0.142    |
| 5       | SM 5             | 0.081       | 0.097      | 0.092    |
| 6       | SM 6             | 0.267       | 0.260      | 0.278    |
| 7       | SM 7             | 0.601       | 0.604      | 0.607    |
| 8       | SM 8             | 0.472       | 0.401      | 0.411    |

|         |       |       |       |       |
|---------|-------|-------|-------|-------|
| 9       | SM 9  | 0.301 | 0.321 | 0.304 |
| 10      | SM 10 | 0.101 | 0.106 | 0.111 |
| Minimum |       | 0.052 | 0.051 | 0.052 |
| Maximum |       | 0.601 | 0.604 | 0.607 |

The analysis report revealed that the fluoride content in water sample taken from the bore wells ranges from .050 to .689 PPM all different sampling station. Fluoride in water results in a substantial reduction in dental carries in children and adults. It is always been desirable in water if the limit is below 0.6 PPM. In the case if the limit is more than the threshold limits the water source cannot be discarded as such but some health measures should be taken to correct the water of that source.

In this analysis fluoride concentration is found under the permissible limit so in these particular areas of umariya city no cases of fluorosis and dental carries were found. In UM8, UM7 Fluoride concentration was highest but in UM1, UM2, UM3, UM4, UM5, UM6, UM9, UM10, sampling sites fluoride concentration was under the limit.



**Acknowledgement :-** Authors are thankful to Mr. Purushottam Nanda, Mr. Mahesh Gupta, Mr. Shriram Sharma, Mr. Ajay Kumar Singh, Mr. Omprakash Singh and other member for their valuable help in sample collection.

**References :-**

1. Khadsan, R.E. (2007), Analysis of fluoride in borewells of Chikhli city, Dist. Buldana (M.S.). Journal of Ultra Chemistry, 3(1) P93-95.
2. Honda, B.K. (1988), fluoride occurrence in natural water in India and its significance Bhujal News, 3(2), P-3-7.
3. WHO, international standard for drinking water (1971) 3<sup>rd</sup> Edition, W.H.O., Geneva.
4. Magregian, S. (1954) Rapid spectrophotometric determination of fluoride with Zirconium eriochrome cyanite R label, Anal, chem., 26, P 1167 – 1166.
5. APHA (1993), Standard methods for the examination of water and waste water, 16<sup>th</sup> edition American public health association, Washington for D.C. 2005.
6. Shafqat Alauddin, Shailendra Yadav (2016) Study of fluoride concentration in the ground water of Atrauliya Nagar Panchayat area of Azamgarh. IJETER Volume 4, Issue 1, January 2016.
7. Handa B.K. (1975), Geochemistry and genesis of fluoride containing ground water in India groundwater, 13(3) P 275-281.
8. Manivaskam, M. (1996), Physico-Chemical Examination of water, sewage and industrial effluents pragati prakashan, 3<sup>rd</sup> Edition P-83-88.
9. Spectrophotometric determination of Iron, Nitrate and Phosphate in the river Tamsa of Azamgarh city. Journal of Chemistry and Chemical Sciences, Vol. 2 (04) , October 2012, 160-164
10. Spectrophotometric determination of Iron, Nitrate and Phosphate in the river Gomati of Jaunpur city. International Journal of Scientific Research, Vol. 1 (06) , 2012, 96-100

11. Spectrophotometric determination of Iron, Nitrate and Phosphate of the water of the river Sai of Jaunpur. Paripex-Indian Journal of Research, Vol. (03), 2012, 34-36
12. Spectrophotometric determination of Iron, Nitrate and Phosphate of the water of the river Tons at Mau (Maunath Bhanjan) International Journal of Scientific Research, Vol.1(07),2012,84-85
13. Spectrophotometric determination of Anionic Detergents in the River Sai at Jaunpur. Paripex-Indian Journal of Research, Vol.1(12),December 2012,72-73
14. Spectrophotometric determination of Anionic Detergents in the River Tamsa at Azamgarh city. International Journal of Engineering Sciences & Research Technology, Vol.1(10),November 2012,558-561
15. Study of Fluoride in the water of bore-wells of North Humayunpur locality and adjoining areas of Gorakhpur City, U.P. International Journal of Scientific Research Engineering and Technology, Vol.1(08),2012,01-03
16. Study of Fluoride Contents in the water of Bore-wells Jaunpur City. International Journal of Basic and Applied Chemical Sciences, Vol.2(04), 2012, 99-101
17. Analysis of Fluoride in the water of bore-wells of Azamgarh City, U.P. Elixir Pollution, Vol.57,2013, 13991-13992
18. Spectrophotometric determination of Anionic Detergents in the River Tonse Mau (Mau Nath Bhanjan) Journal of Chemistry and Chemical Sciences , Vol. 3 (01) , January 2013,31-35
19. Study of Fluoride Concentration in the water of bore-wells of Mau (Mau Nath Bhanjan)

City, U.P.

International Journal of Integrative Science Innovation and Technology,

Vol.2(01),2013,16-18

20. Spectrophotometric determination of Anionic Detergents in the River Gomati at Jaunpur CityElixir Appl. Chem., Vol.59 A,2013, 15651-15653

21. Study of fluoride concentration in the ground water of Atrauliya Nagar Panchayat area of Azamgarh district.

International Journal of Emerging Technologies in Engineering Research, Vol. 4(1), 2016,78-80

22. Study of some new substituted Thiadiazole derivatives as fungicides.

International Journal of Innovative Research and Development, Vol.5(05),April 2016, 12-14

23. Study of Some New Substituted Pyrazoline Derivatives as Fungicides.

Indian Journal of Applied Research, Vol.6(05),May2016,18-20

24. Study of water quality parameters of the ground water of Atrauliya Nagar Panchayat are Azamgarh district.

International Journal of Emerging Technologies in Engineering Research, Vol. 5(10), 2017,24-26