

A study of fluoride in ground water of Shivpuri block and Pichhore blocks, Shivpuri district, (M.P.)

NAVEEN KUMAR SINGH* and D.S. KADAM

Chemical Research Laboratory, Department of Chemistry,
SMS Government Model Science College, Gwalior (India)
Government Chemical Lab., Division Ground Water Survey, Gwalior (India)

(Received: October 15, 2007; Accepted: November 17, 2007)

ABSTRACT

22 ground water samples collected from different areas of Shivpuri & Pichhore block (M.P.) were analyzed for fluoride. The maximum concentration of fluoride has been observed as 3.60 mg/L in the sample from Muhari (Pichhore).

Key words: Fluoride and Ground water quality, Shivpuri district.

INTRODUCTION

Water is the basis of existence of all life form in our biosphere of all the planets. Renewable resources, water has a unique place. It is essential for sustaining all forms of life, food production, and economic development and for general well being. The cause of chemical aquatic pollution are⁴⁻⁶ of numerous types among various chemical pollutants. High fluoride concentration has been reported from several states of India. Fluoride pick up in the surface water in India is not uncommon and most of the surface waters acquire high amount as compared to the situation two or three decades back, the reasons being rapid industrial activities, mining for unearthing resources, dam construction etc. Fluoride ion⁸ beyond a tolerable limit is responsible for a debilitating condition in various line stocks known as fluorosis, a disease related with dental and skeletal tissue.

Excessive fluoride⁷ in the ground water meant for drinking is a problem in the M.P. state of India. The fluoride concentration is increasing beyond the safe limit of 1.5 ppm or 1.5 mg/L. This is attributed to over exploitation of ground for irrigation and other uses. One of the worst hit areas, in M.P.

state is Shivpuri district where signs of fluorosis are increasing at an alarming rate. But there is a little information available on fluorosis in Shivpuri district.

MATERIAL AND METHODS

The water samples were collected from different areas of ground water¹⁻². The samples were collected during the month July 2006. Samples for analysis were collected in sterilized bottles (plastic). The determination of Fluoride elements was carried out by visible-UV spectrophotometer 128 using.

Fluoride

Spectrophotometric method

RESULTS AND DISCUSSION

Fluoride enters into the body through a variety of sources viz-water, food, medicaments and cosmetics. Fluoride has been associated with mottled enamels of teeth and non skeletal fluorosis when present in drinking water in excess of 1.5 mg/L. Skeletal fluorosis has been observed in human where water contains more than 3 mg/L fluoride. The relationship of fluoride with teeth is unique on one

side of the balance it is said to be beneficial to the development of teeth and on the other hand it causes defect in teeth.

In M.P. the main source of fluoride^{6,7,8} in ground water is fluorapatite in areas covered by granite and granitic gneisses. The excess limits of

S. No.	Sample point	No of sample (analysis sources)	Minimum of F ⁻	Maximum of F ⁻	F ⁻ effected sources
1	Guraval(s)	4	0.86	2.34	1
2	Kararkedha(p)	8	1.06	3.25	2
3	Naanda(p)	6	1.13	2.12	1
4	Muhari(p)	4	1.22	3.60	1

The maximum permissible limit of fluoride in drinking water has been fixed as 1.5 mg/L by BIS³ (1991), S= Shivpuri P= Pichhore

Concentration of Fluoride between(mg/L)	Health hazard
(1)-1.5 to 4.0	Mottling and staining of teeth
(2)-4.0 to 8.0	Dental caries and minor skeletal deformation
(3)-above 8.0	Acute osteo fluorosis stiffness in joints ,skeletal deformation, thyroid changes, Kidney damage.

fluoride in drinking water is of main acute for serious health problem and deformation bones(skeleton fluorosis).The villagers are advised to use the drinking water after alum treatments.

ACKNOWLEDGMENTS

The authors are thankful to Dr. K.P.S. Chauhan for his invaluable guidance and help in determination of the Fluoride.

REFERENCES

- Standard method for the examination of water and waste water 18 edition prepared and published jointly by APHA, AWWA and WEF(1992)
- World Health Organization(WHO), International standard for Drinking water Geneva (1984)
- IS10500, Indian standard drinking water specification bureau of Indian standards, New Dehli, 5, (1991)
- Apambire W.M., Boyle D.R. and Michel F.A., Geochemistry ,genesis and health implications of fluoriferous of Ghana , *Environmental geology* **35**(1): 13-24, (1997)
- NRC(National Research council) ,Drinking water and public health, Vol. No 1, safe drinking water committee ,National Academy press ,Washington D.C. (1997)
- Singh ,Naveen Kumar ,Chauhan K.P.S. and Kadam D.S., *Ultra Chemistry*: **2**(2): 227-228,(2006)
- Singh ,Naveen Kumar and Kadam, D.S, *Int. J Chem.Sci*: **5**(2): 592-596,(2007)
- Singh ,Naveen Kumar and Kadam, D.S, *Current World Environment*: **2**(1): 97-98, (2007)
- NTMD ,Prevention and control of fluorosis ,National Technology mission on Drinking water ,AIIMS, New Delhi (1991)
- Nanyaro J.T. et al ,A geochemical model for the abnormal fluoride concentrations in waters in parts of Northern Tanzania, *J.Afr.Earth Sci.*, **2**(2): 129-140,(1984).