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A Study of Fluoride Content in Drinking Water of Bundi District

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Abstract

Fluoride has beneficial effect on teeth at low concentrations of 1mg/L. by preventing and reducing the risk of tooth decay. Concentration lower than 0.5 mg/L. of fluoride however have shown to intensity the risk of tooth decay. Fluoride can also be quite detrimental at higher concentration exceeding 1.5-2 mg/L. water. Higher concentration of fluoride pose of dental fluorosis as well as skeletal fluorosis and orteoporosis. Forty five (45) ground water samples collected from different areas of Bundi District were analyzed for fluoride. Fluoride level is found in the range from 1.55 to 7.00 mg/L. The high concentration of fluoride is of serious concern, as it causes health problem to the local population.

Keywords: Fluoride, Ground water, Fluorosis.

Introduction

Fluorine is 13th most aboundant element of halogen group having At. No.-9 and M.W.-19, available in the earth's crust. It is the most electronegative of all the elements known to the world and exists as a diatomic molecule with a remarkably low dissociation- energy (38 Kcal/mole). As a result it is highly reactive and has strong affinity to combine with other elements to produce compounds known as fluorides.

Leaching of fluoride bearing minerals is the principal source of fluoride in ground water. Same mane made activities are also responsible for the rise of fluoride level in ground water of same place. Cryolite, a mineral of fluoride is used for the production of aluminium and pesticide. Similarly, another mineral rock phosphate is used for the production of phosphate fertilizer, These fertilizers and pesticides are used in large scale in agriculture and thus, they contribute to the rise of fluoride level in ground water. Manufacturing processes of Ni, Cu, Steel glass, brick, ceramic, glues, adhesives, drugs and cosmetic products have Contributed to the rise of fluoride level in ground water.

In 1984, the World Health Organization gave a guideline value of 1.5 mg/L. (1.5 ppm) as the maximum permissible level for fluoride in drinking water. This reflected the state of research on fluoride. A certain amount was considered good for human health but more research changed this attitude.

Experimental

A survey was conducted in 63 villages during July 2013 to 2014 in Bundi district Rajasthan. Samples were collected from tube well, hand pumps, well and other sources. In the present study there is no industrial like smelted plant power station, fertilizer corporation etc. area with capabilities of producing fluorides contains in the ground water. So the main source of fluoride and there concentration in water is geological source.

S. No.	Source	Gram Panchayat	Block	Total, Number of sample	Flouride
1.	Handpump-1 Well-1 Other -1	Umar	Hindoli	3	1.00-1.60 Mg./L.
2.	Handpump-1 Well-2 Other -2	Ghat Ka Barana	Keshorai patan	6	2.40-4.20 Mg./L.
3.	Handpump-2 Well-2 Other -3	Lesarda	Keshorai patan	7	0.78-1.55 Mg./L.
4.	PWS-1 Well-1 Other -	Dokoon	Nainwa	3	0.85-1.60 Mg./L.
5.	Handpump-1 PWS-0 Well -1 Treatment plant-1 Other -1	Bambori	Talera	4	1.25-1.8 Mg./L.
6.	P.W.S.-1 Well-2	Dehit	Talera	4	5.29-7.00 Mg./L.
7.	P.W.S.-4 Well- 2	Khatkhar	Talera	8	0.78-1.60 Mg./L.
8.	Handpump- 1 Other -1 Treatment Plant -1	Khyyawda	Talera	3	1.60-2-40 Mg./L.
9.	Other -2	Lalpura	Talera	2	4.20-5.20 Mg./L.
10.	H.P.- 1 P.W.S.-1 Well -2 Other -1	Namana	Talera	5	0.72-1.60 Mg./L.

Results and Discussion

Both types of effects, beneficial and adverse came be caused from fluoride exposure. A concentration less than 0.6 mg/L. result in dental carries, whereas high level (>1.2 mg/L.) results in fluorosis.

The maximum permissible limit of fluoride in drinking water is 1.5 mg/L. according to WHO. Investigations show that fluoride level ranges from 1.55 to 7.00 mg/L.

Ground water of Bundi District also centaminated by fluoride. The worst affected Block is Teleara. The fluoride level in ground water from Dehit, Khyawda, Lalpura was found to be range 2.40 to 7.00 ml/L.

Long term consumption of water containing 1mg of fluoride per liter leads to dental fluorisis. Flouride When consumed in excess can cause several ailments besides skeletal and dental fluosis. This has been observed in persons when water contains more than 3-6 mg/l. of fluoride. Skeletal fluorisis affects young and old alike. Fluoride can also damage the foctus. if the mother consumes water and food, with a high concentration of fluoride during pregnancy.

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