

# A STUDY OF FLUORIDE CONTENT IN DRINKING WATER OF SIDHI DISTRICT (M.P.)

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**ABSTRACT:** Fluorine (F<sup>-</sup>) is a chemically reactive electronegative univalent gaseous halogen found in small amount in the water, air, plants and animals. Fluorine is essential for the maintenance and solidification of our bones and to prevent dental decay. It has beneficial effects on teeth and bones when it is present at low concentration in drinking water, but excessive exposure to fluoride in drinking-water, or in combination with exposure to fluoride from other sources, can give rise to a number of adverse effects which include teeth decay, osteoporosis and harm to kidney, bones, reproductive organs, nerve and muscle. 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 osteoporosis. Forty five (45) ground water samples collected from different areas of Sidhi 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

Fluoride is an inorganic, monatomic anion of fluorine with the chemical formula F<sup>-</sup>. Fluoride is the simplest anion of fluorine. Its salts and minerals are important chemical reagents and industrial chemicals, mainly used in the production of hydrogen fluoride for fluorocarbons. In terms of charge and size, the fluoride ion resembles the hydroxide ion. Fluoride ions occur on earth in several minerals, particularly fluorite, but are only present in trace quantities in water. Fluoride contributes a distinctive bitter taste. It contributes no color to fluoride salts. Fluorine is 13th most abundant 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 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 man 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 50 villages during July 2015 to 2016 in Sidhi district Madhya Pradesh. 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	Kushmi	Kusmi	3	1.00-1.60 Mg./L.
2.	Handpump-1 Well-2 Other -2	Piprahi	Kusmi	6	2.40-4.20 Mg./L.
3.	Handpump-2 Well-2 Other -3	Naikin	Rampur Naikin	7	0.78-1.55 Mg./L.
4.	PWS-1 Well-1 Other -	Pipron	Rampur Naikin	3	0.85-1.60 Mg./L.
5.	Handpump-1 PWS-0 Well -1 Treatment plant-1 Other -1	Amiliya	Sihawal	4	1.25-1.8 Mg./L.
6.	P.W.S.-1 Well-2	Bahari	Sihawal	4	5.29-7.00 Mg./L.
7.	P.W.S.-4 Well- 2	Kamrji	Sidhi	8	0.78-1.60 Mg./L.
8.	Handpump- 1 Other -1 Treatment Plant -1	Rampur	Sidhi	3	1.60-2-40 Mg./L.
9.	Other -2	Majholi	Majholi	2	4.20-5.20 Mg./L.
10.	H.P.- 1 P.W.S.-1 Well -2 Other -1	Majhigavan	Majholi	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 Sidhi District also contaminated by fluoride. The worst affected Block is Sihawal. The fluoride level in ground water from Barahi Sihawal 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 fluorosis. Flouride When consumed in excess can cause several ailments besides skeletal and dental fluorsis. This has been observed in persons when water contains more than 3-6 mg/l. of fluoride. Skeletal fluorosis affects young and old alike. Fluoride can also damage the focus.

If the mother consumes water and food, with a high concentration of fluoride during pregnancy.

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