



STATUS OF FLUORIDE IN UNDERGROUND WATER AT KANDHAR TALUKA, DIST. NANDED

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ABSTRACT

The present study was carried out to measure fluoride levels of ground water consumed in the villages of Kandhar division of Nanded district. Fluoride content in bore holes, hand pumps, and dug wells were higher than permissible limits and ranged between 4.0-6.5ppm.

INTRODUCTION

Water is essence of the living process. It is the most abundant and the most versatile of the chemicals of life. Water is the most uniquely remarkable substance known. It is essential for every living body.

Fluoride exists naturally in water sources and is derived from fluorine, the thirteen most common elements in the earth crust. The most electronegative of all elements has not only notable chemical qualities but also physiochemical properties of great interest and important to human health. It is well-known that fluoride helps to prevent and even reverse the early stages of tooth decay.

The fluorides are emitted by natural and anthropogenic activities into the environment. Human requires fluorides as it is a mineral. Fluorides are essential for bones, but due to increasing pollution fluorides levels are increasing in the environment and also in the human body. Fluoride permissible limit in the drinking water is 1.5ppm but its high concentration is occurring naturally in the ground water in many parts of the world. Fluoride can enter ground water by natural processes; the soil at the top of mountains is particularly likely to be high in fluoride from the weathering and leaching of bedrock with high fluoride content.

STUDY AREA

The study area comprises the Kandhar Taluka of Nanded District. In this region there is no special water supply from corporation. People from this region have to depend upon

the underground water sources for the domestic as well as irrigation purposes. The special emphasis is given to the fluoride concentration of the ground water of the study area. According to many of studies, Nanded District is having history of fluoride concentration far above the permissible limit. Due to the excessive concentration of fluoride, the cases of Dental and Skeletal Fluorosis are found in large number. According to the District Health Department, there are 5 to 6 villages of Kandhar Taluka Dist. Nanded, where the ground water shows high concentration of fluoride. In the present investigation, concentration of fluoride was estimated in prone villages of Kandhar Taluka of Nanded District, Maharashtra.

The fluoride was estimated by spectrophotometric method (APHA 2005). Fluoride reacts with Zr alizarins lake to form colorless Zr F6-2 and the dye. The color of the dye lake becomes progressively weak with increase in amount of Fluoride. Take 50ml of sample and add 10ml of acid Zirconyl SPANDS reagent to all samples. Mix well and read the optical density of bleached color at 570nm using reference solution. If the sample contains residual chlorine remove it by NaAsO₂ solution by adding one drop. Mix thoroughly and compare the samples and standards after one hour.

In general, F levels in the groundwater samples from all sources were higher (4.0 -6.5ppm) than its permissible limits (1.0 - 1.5ppm). Its concentrations differed in both time and space, being higher in summer than rainy season. Among different villages, its maximum concentrations were found in Kashiram Tanda and Babulgaon (Table 1).

Table 1. Concentrations of Fluoride at different sampling sites

Village	Water Source	F Concentration (ppm)	
		Wet season (October)	Dry season (March)
Kashiram Tanda	Dug well-1	4.0	5.5
	Borewell-1	5.5	6.5
	Borewell-2	5.5	6.0
Talachiwadi	Hand pump-1	5.5	5.5
	Hand pump-2	5.0	5.5
	Hand pump-3	5.5	5.5
Babulgaon	Bore well	4.5	5.0
	Bore well	4.5	5.0
Dahikalamba	Dug well-1	4.0	6.5
	Well water-1	6.0	6.0
Sawaleswar	Bore well-1	4.5	5.0
	Bore well-1	4.5	5.0
Telur	Bore well-2	4.5	5.0
	Common well-1	4.0	5.0

During field surveys, we observed high incidence (up to fifty five percent) of dental and skeletal fluorosis in the villages. The residents were worried about incidence of dental fluorosis though most of them were not aware about the cause or remedies of the problem. The main sources of water available to the residents have unacceptable levels of fluoride. Only treatment with alum + lime may reduce levels of fluoride which residents do not add in their drinking water. Rain-water harvesting is the other option for safe drinking water.

REFERENCES

- APHA. 2005. Standard methods for the Examination of Water and Waste Water. American public Health Association. 21st Edition.