Study of fluoride content in drinking water of selected bore-wells in Mandya city of Karnataka, India

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ABSTRACT

Major water supply for agriculture and domestic purpose in Mandya district is from Krishna Raja Sagar reservoir. Even then, residents of most of the areas of Mandya city are mainly dependent on bore well water for domestic and small scale industries, especially in summer season. Hence large numbers of bore wells are existed. Fluoride content of selected twenty five bore-well water in and around of Mandya city was analyzed in the month of January, 2009. The study reveals that the fluoride concentration is within the permissible limits in all places of Mandya city as prescribed by BIS and WHO. Hence the bore-wells water of Mandya city can be conveniently used for drinking without any pre-treatment.

Key words: Fluoride concentration, Bore well water, Fluorosis, Krishna Raja Sagar (KRS), Mandya city.

INTRODUCTION

Mandya district is generally called as "sugar city" of Karnataka; since sugarcane is major crop of the district. The city has a very high heritage for its cultural and historical backgrounds. A famous Mysore sugar factory is located in the city. Krishna Raja Sagar (KRS) dam, historical temples at Melukote, Tippu palace at Sriranga patna, Vaidyanatheshwara temple, Athmalingeshwara temple etc are situated in Mandya district.

Water is most common and important resource on the earth (Suthar et al., 2001). However, the availability of water varies from place to place and time to time. As a result, there is a persistent scarcity of water in many parts of the world. Exponential growth in population creates an everincreasing demand of water for irrigation, industry and domestic use (Shankar et al., 2004; Wright, 2007).

Due to the population growth within the city than in the villages, the scarcity of water arises especially during summer season in Mandya city. Krishna Raja Sagar (KRS) dam mainly meets the demand of water for drinking and irrigation purpose, which is 28 km away from the city. But during summer season, there is shortage of water supply from KRS dam. As a result, a large number of bore wells existed in the city to meet the water demands. The poor quality of drinking water is more due to the contamination than due to the natural inferiority of the sources. Fluorides are present in both surface water and ground water. Most of the fluoride found in ground water results from weathering and circulation of water in rocks and soils. The chemical quality of ground water varies even at short distances. This variation may be attributed to the variations in the hydro chemical process (Maniraju, 2006). Fluoride in small dosages has remarkable influence on the dental system inhibiting dental curies, while consumption of high dosage fluoride

water causes fluorosis (Shukla et al., 2004). In India about 62 million people including 6 million children, suffer from fluorosis due to high content of Fluoride in water (Susheela, 1990). The present analysis is an attempt to evaluate the fluoride content of bore well water in Mandya city of Karnataka.

MATERIAL AND METHODS

In the present study, twenty five bore well water samples of selected areas in and around Mandya city were analyzed. The samples were collected in clean polythene bottles of 2 ltr capacity. The bottles were first rinsed with distilled water and then two to three times by the sample water before collecting for analysis.

Fluoride concentrations in water samples were determined using the parameters prescribed in standard methods for the Examination of water and wastewater APHA (1995). Water pollution levels at various spots in the city were analyzed and compared with that of drinking water standards prescribed by BIS and WHO.

Samples	Fluoride (F ⁻)	Samples	Fluoride (F ⁻)
S1	1.0	S14	1.0
S2	1.1	S15	1.2
S3	1.0	S16	1.1
S4	1.2	S17	1.2
S5	0.9	S18	1.3
S6	0.5	S19	1.0
S7	0.5	S20	1.2
S8	0.8	S21	1.0
S9	0.7	S22	1.1
S10	0.6	S23	1.0
S11	0.8	S24	1.2
S12	1.0	S25	1.3
S13	0.9		

Table 1: Fluoride ion concentration in bore well water samples (ppm)

RESULTS AND DISCUSSION

Fluoride has little significance in industrial water; where as ingestion of excess fluoride in drinking water can cause fluorosis (Shukla et al., 2004), which affects the teeth and bones.



Fig 1: variations of fluoride concentration in bore well water samples of Mandya city.

Below the permissible limits, it is an effective preventive of dental curies, but above the permissible limits may cause disfigurement of teeth and severe skeletal fluorosis. Such water should be defluorinated to reduce fluoride concentration to the acceptable levels for drinking purpose.

The observed results were compared with the standard values of BIS and WHO (i.e., 0.6 - 1.5ppm).

CONCLUSION

The present analysis concludes that, the fluoride concentration (Table: 1 and Fig: 1) of all the

samples are well within the permissible limits as prescribed by BIS and WHO and the results reveals that the bore wells water of Mandya city are fit for drinking without any pretreatment for fluoride contents. But other physico-chemical parameters of these bore-wells water have to be analyzed for its suitability for drinking.

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