

DETERMINATION OF FLUORIDE CONTENT IN DIFFERENT GROUND WATER

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ABSTRACT

This project deals with determining the fluoride on different ground water sample. In this broadside analysis of different ground water was tested for content of fluoride ions in bottled mineral water significantly differs from values given on declaration, and that content of fluoride ions varies over a period of time. The content of fluoride ions in water from ground water in Nagpur and Bhandara districts at the time of analysis was significantly increased and exceeded values given in Regulation for drinking water quality. The received results from the analysis of fluorides in teas show that fluorides exist in teas in different concentrations.

It may due to the presence of different types of fluoride bearing minerals with different solubility. Considering WHO safe limit 0.5 ppm or mg/L of fluoride in drinking water, nearly 82% of the tested waters are contained injurious concentration of fluoride for drinking water purposes limit 0.5 ppm or mg/L of fluoride in drinking water, nearly 82% of the tested waters are contained injurious concentration of fluoride for drinking water purposes. A safe limit of 0.5 ppm or mg/L of fluoride has been proposed for all types of crop plants. Also the Unsafe condition limit was 2.0 ppm or mg/ltr and Alert limit 1.0 ppm or mg/ltr.

1. INTRODUCTION

Fluoride is a naturally occurring compound derived from fluorine, it is present naturally in almost all foods and beverages including water, but levels of which can vary widely. Fluoridation is the addition of fluoride compounds into drinking water, to adjust concentrations to levels between 0.8 and 1.0 mg/Lt for the beneficial effect of tooth decay prevention. The fluoride accumulation of ground water varies according to the source of water, geological formulation of the area and amount of rain fall etc¹.

Traces of fluorides are present in many waters, higher concentrations are often associated with underground sources which in turn vary with the type of rock the water flows through. Low concentrations (0.6-1.5mg/ltr) provide protection against dental caries, especially in children. Fluoride can also have an adverse effect on tooth enamel and may give rise to mild dental Fluorosis. In India, approximately 62 million people including 6 million children suffer from fluorosis because of high consumption of high Fluoride content. Longer exposure to Fluoride leads to certain types of bone diseases. Fluoridated water has

fluoride at a level that is effective for preventing cavities; this can occur naturally or by adding fluoride².

Fluoridated water works on tooth surfaces: in the mouth it creates low levels of fluoride in saliva, which reduces the rate at which tooth enamel demineralizes and increases the rate at which it remineralizes in the early stages of cavities.⁵

The compounds are potentially serious contaminants not only when present in highly localized, massive concentrations, but also when distributed in low-level amounts over a long period of time. Fluoride intake has always been considered a key factor for prevention of dental caries and improvement of public dental health. Fluoride makes the tooth-enamel surface acid resistant by preventing bacterial demineralization and promotes remineralization of initial non-cavitated carious lesions. It also shows antimicrobial activity; in low concentrations it prevents bacterial adhesion to tooth structure while in high concentration the fluoride ion is highly toxic to certain oral microorganisms.

The main source of systemic fluoride in children is from drinking water (tap + bottled), carbonated beverages and

Table 1: Distribution of Fluoride in Ground Water samples

SN	WATER SAMPLE	CODE	CONDITION	RESULT
1	KORADI COLONY	S1	SAFE	0.0 PPM
2	SAONER	S2	SAFE	0.0 PPM
3	HINGNA	S3	SAFE	0.0 PPM
4	MAHADULA	S4	SAFE	0.0 PPM
5	DATTAWADI	S5	SAFE	0.0 PPM
6	MITEWANI	S6	SAFE	0.0 PPM
7	PIPLA	S7	SAFE	0.0 PPM
8	XTREME (BOTTLE WATER)	S8	SAFE	0.0 PPM
9	PYRAMIDE (BOTTLE WATER)	S9	SAFE	0.0 PPM
10	TCOP PHARMACY	S10	SAFE	0.5 PPM
11	BURIJWADA	S11	SAFE	0.5 PPM
12	HAJARI PAHAD	S12	SAFE	0.5 PPM
13	TUMSAR (GROUND WATER)	S13	ALERT	1.0 PPM
14	KORADI (GROUND WATER)	S14	ALERT	1.5 PPM
15	TUMSAR (LAKE WATER)	S15	UNSAFE	2.0 PPM

other juice drinks.

Worldwide, vast majority of consumers that include children are replacing their daily water intake by bottled water, probably attributed to the fear of less purity of natural water supply and the presence of contaminants such as micro-organisms or sand particles.

2.0. MATERIALS AND METHODS

1. Keep the standard Fluoride Colour Chart in the Chart Holder.
2. Collect the water sample to be tested in breaker.
3. Take one tube, rinse it well with sample water fill it up to mark (4 ml)
4. Now add drop-by- drop Fluoride Reagent Solution till it reached to the upper marking, which is 5 ml & mix well.
5. Colour will be developed instantly. Keep the test tube in the slot provided on the chart holder.
6. Compared the developed colour with that of standard on the chart. Colour which matches or nearly matches with the developed colour is the reading for Fluoride concentration in ppm or mg/Lt present in the water sample.

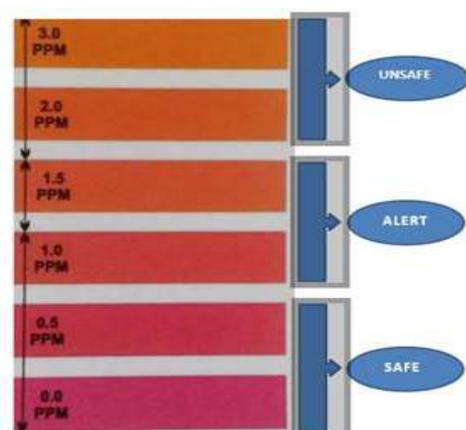


Figure 1: Standard Colour Chart

3.0 RESULTS AND DISCUSSION

The distribution of the groundwater samples containing different amounts of fluoride showed in fluoride testing table 1. The fluoride concentration was ranged from 0.0–2.0 ppm or mg/L with highest fluoride level at Tumsar Lake (2.0 ppm or mg/L) and lowest at pipla and other location (Koradi, Saoner, Hingna,, Mahadulla, Dattawadi, Mitewani, Xtream (Bottle Water), And Pyramid (bottle Water).

In terms of distribution, the fluoride level Higher than 1.0 ppm or mg/L was observed the condition as Alert at two locations (Tumsar (ground water) and Koradi (ground water)), between 1 and 1.5 ppm or mg/L and the fluoride level greater than 2.0 ppm or mg/L is observed as one location (Tumsar Lake Water). It was 81.97% are safe water found while result.

In addition, 15 samples testing the fluoride range between 0.0 – 2.0 ppm was found (Table 1). The ground water samples from the Tumsar Lake (0.0–2.0 ppm) and Koradi (0.0–1.5), having very high fluoride content. From above observation Tumsar (ground water) was found to be (0.0–1.0) ppm or mg/L and Hajaripahad, Barujwada & TCOP was found to be (0.0–0.5) ppm or mg/L. The Lowest fluoride concentration was found to be range from (0.0–0.0) ppm or mg/L are Hingna, Mahadulla, Dattawadi, Pipla, Saoner, Xtreme (bottle water) and Pyramid (Bottle water).

The fluoride concentration was ranged from 0.0 –2.0 ppm or mg/L with highest fluoride level at Tumsar Lake (2.0 ppm or mg/L) and lowest at pipla, Dattawadi, Mahadulla, Hingna, Soner, Xtreme (Bottle water) (0.0 ppm or mg/L) in safe condition, TCOP pharmacy, Buriywada, and Hajaripahad (0.5 ppm) in terms of safe condition. In terms of distribution, the fluoride level lower than 1.0 ppm or mg/L was observed the condition as Alert two locations (Tumsar ground water) & Koradi ground water between 1 and 1.5 ppm or mg/L.

It was 81.97% are safe while result. The obtained results show the reliability of the method by determining fluorides in drinking water in most samples. Lack of referential value (in bottled waters) refers to the fact that manufacturer has to analyses water that is put on the market regularly, because significant deviations from measured values, which are given and/or are not given on declaration are noticed.



Figure 2: Distribution of Fluoride in Ground Water samples

4.0. ANALYSIS:

From the experimental analysis, the concentration of fluoride does not correlated with other chemical characteristics of the groundwater most probably. It may due to the presence of different types of fluoride bearing minerals with different solubility. Considering WHO safe limit 0.5 ppm or mg/L of fluoride in drinking water, nearly 82% of the tested waters are contained injurious concentration of fluoride for drinking water purposes limit 0.5 ppm or mg/L of fluoride in drinking water, nearly 82% of the tested waters are contained injurious concentration of fluoride for drinking water purposes. A safe limit of 0.5 ppm or mg/L of fluoride has been proposed for all types of crop plants. Also the Unsafe condition limit was 2.0 ppm or mg/ltr and Alert limit 1.0 ppm or mg/ltr while experimental and result analysis. Our data suggest that almost all waters tested can utilize for irrigation. Only the waters at eleven locations can use for drinking

4.0 CONCLUSION:

The concentration of fluoride in all water samples must not exceed the limit decided by WHO. However, there are great variations in concentration of fluoride among different analyzed water samples. It is observed form the above study that fluoride content in certain areas was found above the levels than required. Since drinking water is a basic need, the people in those areas should consume protected water containing fluoride within the prescribed limits in order to prevent dental and skeletal Fluorosis for the future generation.

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