Determination of Fluoride in Rural Parts of Kapadwanj Region, District Kheda, Gujarat

S.N. PANDYA*, D.K. BHOI, H.R. DABHI and M.B. CHUAHAN

*Department of Chemistry, J & J College of science,Nadiad, India.
*Department of Chemistry, Navjivan science college Dahod, India.

ABSTRACT

Analysis of well and bore well water samples for fluoride from eighteen sampling stations of Kapadwanj(Rural area) for a period of one year(2012) during different seasons has been carried out. The analysis of different parameters namely- temperature, pHTDS and Fluoride was carried out as per standard methods. The results were compared with the values stipulated by Indian standards for drinking water . It was found that the fluoride content of all the samples obtained was well below the permissible limits.

Key words: Fluoride, Content, Kapadwanj,- Rural Area.

INTRODUCTION

Fluoride in ground water is due to fluorspar, cryolite, fluorspatite and hydroxylapatite .Excess fluoride consumption affects plants and animals. The fluoride accumulation of ground water varies according also have an adverse effect on tooth enamel and may give rise to mild dental Fluorosis[3]. Longer exposure to fluoride leads to certain types of bone diseases[4,5] also. Statistics reveal that fluoride poisoning is more spread than the Arsenic contamination in ground water in the country[6] In view of the above, it is attempted to carry out a systematic study on fluoride contamination of ground water resources of certain rural areas of Kapadwanj,Dist-Kheda,Gujarat.

MATERIALS AND METHOD

Water samples (Bore Well & Open Well) collected from eighteen sampling stations selected for the analysis .

All the sample bottles were stored in iceboxes till brought to the laboratory for analysis.

Solutions used for the studies were prepared from analytical grade chemicals, in double distilled water or in high purity organic solvents. All the chemicals and reagents used were of analytical grade. D.D water was used for the preparation of solutions. The analysis of parameters namely PH**,**temperature and fluoride was carried out – as per the methods described7 in APHA (1995). Determination of fluoride has been carried out using Eu Tech Cyber scan 2100 instrument.

RESULTS AND DISCUSSION

The results obtained on the determination of temperature, pH TDS and fluoride are presented in Tables -1 to 3

Temperature

A rise in temperature of water reduces the solubility of gases and amplifies the tastes and odors. The temperature was measured using a centigrade thermometer by 110°C on site. The temperature of the present study ranged from 26.1 to 31.9°C.

pH

High pH levels are undesirable since they may impart a bitter taste to the water. Furthermore, the high degree of mineralization associated with alkaline water will result in the encrustation of water pipes and water-using appliances It is known that pH of water (6.5 to 8.5) does not has no direct effect on health. But lower value below 5.0 produce sore taste and has higher value above 8.5 are of alkaline taste. The pH values of the present investigation were within the standards (6.9- 8.5)

Table 1: Analysis of Water Samples Collected in winter season

Name of village	Temperatures	PH	TDS (mg/L)	Fluoride(mg/L)
Dana	26.2	7.05	840	0.5
Shankarpura	26.1	7.2	250	0.3
Abaliyara	26.5	6.95	210	0.2
Anklai	27.2	6.90	440	0.5
Narana muvada	26.3	7.20	185	0.8
Vasana	26.2	7.25	410	0.9
Charania	27.1	7.40	240	0.78
Bhagavanji na muvada	26.2	7.05	380	0.5
Torana	27.1	7.0	980	0.5
Antroli	26.5	7.3	480	0.46
Antarsumba	27.0	6.92	710	0.5
Betawada	26.2	7.25	1250	1.0
Navagam	26.4	6.90	490	0.5
Danadara	26.7	7.8	670	1.2
Motizer	27.5	7.05	450	0.78
Zanda	26.9	6.90	460	0.5
Thavad	27.2	7.82	970	0.81
Lalpur	26.7	8.05	370	0.54

Table 2: Analysis Samples Collected in rainy season of Water

Name of village	Temperatures	PH	TDS (mg/L)	Fluoride(mg/L)
Dana	31.3	7.1	640	0.5
Shankarpura	31.7	7.2	250	0.3
Abaliyara	30.5	6.95	210	0.2
Anklai	31.2	6.90	450	0.5
Narana muvada	29.4	7.20	185	0.8
Vasana	29.8	7.0	410	0.9
Charania	29.7	7.5	300	0.78
Bhagavanji na muvada	30.7	6.9	380	0.5
Torana	29.7	7.0	850	0.5
Antroli	30.4	7.3	350	0.46
Antarsumba	30.8	6.92	710	0.5
Betawada	31.9	7.3	1300	1.0
Navagam	29.5	6.9	490	0.5
Danadara	29.6	7.8	650	1.2
Motizer	29.5	7.05	450	0.78
Zanda	31.9	6.90	460	0.5
Thavad	31.2	7.82	850	0.81
Lalpur	29.7	8.1	500	0.54

Table 3: Analysis of Water Samples Collected in Summer season

Name of village	Temperatures	PH	TDS (mg/L)	Fluoride(mg/L)
Dana	31.8	7.0	550	0.3
Shankarpura	31.4	7.2	250	0.2
Abaliyara	30.5	6.95	260	0.5
Anklai	31.2	6.90	440	0.8
Narana muvada	29.6	7.4	185	0.9
Vasana	29.8	7.3	410	0.78
Charania	29.7	6.9	240	0.78
Bhagavanji na muvada	30.7	7.1	380	0.5
Torana	29.7	7.0	950	0.46
Antroli	30.4	7.3	480	0.5
Antarsumba	30.8	6.92	710	1.0
Betawada	31.9	7.25	1000	0.5
Navagam	29.5	6.90	490	1.2
Danadara	29.7	7.8	670	0.78
Motizer	29.5	7.0	450	0.5
Zanda	31.9	6.90	600	1.2
Thavad	31.2	7.82	970	0.5
Lalpur	29.7	7.9	450	0.78

TDS

A large number of solids are found dissolved in natural water the common ones are carbonates,bicarbonates,chloride,sulphate,phosphate ,ironetc,.In other words TDS is sum of the cations and anions concentration.A high contents of dissolve solids elevates the density of water,influences solubility of gases(like oxygen) reduces utility of water for drinking irrigation and industrial purpose. In the present study TDS ranged from 210 mg/L to 1300 mg/L. According to WHO and Indian standards TDS values should be less than 500 mg/L for drinking water.

Fluoride

Out of eighteen sampling stations studied, low fluoride concentration is noticed in the All samples. 1.2 mg/lit as prescribed by Indian standards for drinking water quality[8] .

CONCLUSIONS

It can be concluded form the above study that fluoride content in all areas was found below the permissible levels than required. Hence people in those areas should consume protected water containing fluoride within the required levels .

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