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DETERMINATION OF FLUORIDE IN SOME AREAS OF VIZIANAGARAM DT . AP

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ABSTRACT

The object of the present study is to carry out the Physico – Chemical analysis of well and bore well water samples from ten sampling stations of Bhogapuram mandal,Vizianagaram District (Rural area) for a period of 5 months from November 2010 to March 2011. The analysis of different parameters namely- temperature, pH, color and fluoride were carried out as per standard methods. The results were compared with the values stipulated by WHO and ICMR standards. The results indicate that the fluoride in some sampling stations was found above the permissible limits probably due to contamination with sea water.

KEYWORDS: *Mukkam--Tippalavalasa- kondarajupalem- Fluoride content – Rural Area - AP*

INTRODUCTION:

Fluoride (13th most abundant element) occurs in combined form because of its highly reactive ness. It is present naturally in almost all foods and beverages including water, but levels of which can vary widely. [1].. The fluoride accumulation of ground water varies according to the source of water, geological formulation of the area and amount of rain fall etc[2].

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.

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 [3]. Longer exposure to fluoride leads to certain types of bone diseases[4]. Statistics reveal that fluoride poisoning is more spread than the Arsenic contamination in ground water in the country) [5]. Keeping in view of this, it is proposed to carry out a systematic study on fluoride contamination of ground water resources of certain rural areas of Vizianagaram Dt. AP, India.

Methods and Materials

Water samples (Bore Well & Open Well) collected from ten sampling stations selected for the analysis were given bellow:

S_1–Mukkam, S_2-Chepara kancheru, S_3-kondarajupalem, S_4 -Tippalavalasa, S_5- Arogya upkendram, S_6-water tank, S_7 -High school building, S_8- Chapala kanchiru(outside village), S_9-Ramalayam and S_{10} - Bangruthalli Temple.

Samples for analysis were collected in sterilized bottles using the standard procedure for grab (or) catch samples in accordance with standard methods of APHA (1995) while collection temperature of these areas was noted by 110^0C thermometer. 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 were

carried out – as per the methods described in APHA (1995)[6]. Determination of Fluoride has been carried out using SPADNS method.

RESULTS AND DISCUSSIONS:

The results obtained on the determination of various parameter including are presented in Tables – 1 to 5.

Temperature:

A rise in temperature of water leads to the speeding up of chemical reactions in water, reduces the solubility of gases and amplifies the tastes and odours. The average temperature of the present study ranged from 26.85 - 28.17 ^{0}C.

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 ICMR standards (7.0 – 8.5). Conductivity varies with the season as well as ions present in water.

Chloride:

Chloride occurs in all types of natural waters. The high concentration of chloride is considered to be an indication of pollution by sewage waste of animal origin. Industries are also important sources of chloride in water. Chloride values obtained in the study are found to be higher (212.4 mg / lt) in S_1 sampling station than other stations.

Fluoride:

Fluoride in ground water is due to fluorspar, cryolite, fluorspatite and hydroxylapatite Fluoride bearing rocks such as etc. Excess fluoride consumption affects plants and animals. Out of ten sampling stations studied, low fluoride concentration is noticed in the samples S_3 & S_5 Higher values are obtained from S_9 sampling station, where the fluoride content is (exceeded 1.5 mg/lt) above the permissible limits as prescribed by Indian standards for drinking water quality [7].

Tables – 1 to 5→the determination of various parameters (the results obtained)

(See in Next Page)

Conclusions:

It can be concluded form the above study that fluoride content in some areas was found above the permissible levels than required. Hence 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. Alternatively fluoride concentration can be diluted by inducing following Nalgonda technique ground water recharge techniques. Further, it can also be said that a monitoring system is to be established to periodically evaluate the effects of fluoride contamination.

Table – 1 Physico – Chemical Parameters of Water Samples Collected on 10-11-2010

Station No.	Temperature (^{0}C)	Color	pH	Chloride (mg/lt.	Fluoride (mg/lt.
S1	26.85	Color less	7.36	90.4	1.24
S2	27.50	Color less	7.42	85.6	1.30
S3	27.24	Color less	8.20	45.6	0.69
S4	27.86	Color less	7.58	46.2	0.92
S5	28.12	Color less	7.35	38.2	0.45
S6	27.04	Color less	7.64	65.3	1.28
S7	27.82	Color less	7.81	76.9	1.92
S8	27.94	Color less	8.08	82.3	1.57
S9	26.87	Color less	6.97	146.5	2.42
S10	27.15	Color less	7.80	115.2	1.35

- **All the values are the average of 3 determinations.**

Table – 2 Physico – Chemical Parameters of Water Samples Collected on 10-12-2010

Station No.	Temperature(^{0}C)	Color	Ph	Chloride (mg/lt.)	Fluoride (mg/lt.)
S1	**27.88**	**Color less**	**7.50**	**85.2**	**1.04**
S2	**26.92**	**Color less**	**7.44**	**78.2**	**1.43**
S3	**28.14**	**Color less**	**7.62**	**54.6**	**0.52**
S4	**27.62**	**Color less**	**7.50**	**66.5**	**0.86**
S5	**27.85**	**Color less**	**7.87**	**48.3**	**0.75**
S6	**27.75**	**Color less**	**7.61**	**55.5**	**1.08**
S7	**27.80**	**Color less**	**8.05**	**96.1**	**1.95**
S8	**27.46**	**Color less**	**8.34**	**88.6**	**1.77**
S9	**26.94**	**Color less**	**6.93**	**116.3**	**3.02**
S10	**27.25**	**Color less**	**7.32**	**105.8**	**1.57**

*** All the values are the average of 3 determinations.**

Table – 3 Physico – Chemical Parameters of Water Samples Collected on 10-01-2011

Station No.	Temperature (^{0}C)	Color	pH	Chloride (mg/lt.)	Fluoride (mg/lt.)
S1	27.80	Color less	7.62	78.9	1.02
S2	27.74	Color less	7.51	79.5	1.44
S3	26.90	Color less	7.24	55.9	0.85
S4	27.76	Color less	8.02	66.5	1.04
S5	28.03	Color less	7.61	48.2	0.73
S6	27.95	Color less	7.82	69.8	1.75
S7	27.65	Color less	8.05	70.9	1.47
S8	28.17	Color less	8.28	87.6	1.28
S9	27.52	Color less	8.12	126.8	2.95
S10	27.90	Colorless	8.06	108.5	1.66

*** All the values are the average of 3 determinations.**

Table – 4 Physico – Chemical Parameters of Water Samples Collected on 11-02-2011

Station No.	Temperature (^{0}C)	Color	pH	Chloride (mg/lt)	Fluoride (mg/lt.)
S1	27.59	Color less	7.65	88.7	1.16
S2	27.82	Color less	7.52	76.2	1.40
S3	27.80	Color less	8.15	57.0	0.72
S4	27.62	Color less	7.58	56.5	0.96
S5	28.01	Color less	7.55	48.0	0.37
S6	27.75	Color less	7.64	60.8	1.12
S7	27.88	Color less	7.71	67.5	2.02
S8	27.64	Color less	8.18	72.9	0.65
S9	27.72	Color less	7.57	156.8	3.12
S10	27.80	Color less	7.90	95.6	1.53

- **All the values are the average of 3 determinations.**

Table – 5 Physico – Chemical Parameters of Water Samples Collected on 10-03-2011

Station N	Temperature (^{0}C)	Color	pH	Chloride (mg/lt)	Fluoride (mg/lt.)
S1	27.53	Color less	7.65	87.4	1.20
S2	27.79	Color less	7.82	89.5	1.08
S3	27.54	Color less	7.51	39.2	0.47
S4	27.72	Color less	7.34	54.8	1.02
S5	27.86	Color less	8.02	43.2	1.15
S6	28.10	Color less	7.61	75.8	0.63
S7	27.85	Color less	7.97	86.5	1.35
S8	28.03	Color less	7.47	92.1	1.48
S9	27.89	Color less	7.63	136.8	3.56
S10	27.31	Color less	7.78	95.6s	1.45

- **All the values are the average of 3 determinations**

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