

Assessment of Chloride and Fluoride Content in Ground Water-Devarajugattu, Markapur

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Abstract — Nowadays, the utilization of water increases extremely with the needs of human. If there is no proper recycling and reuse then the water scarcity will increase. To satisfy the human needs it is essential to use the ground water because it is available as fresh water. However, it is important to study the physico-chemical properties such as temperature, color, p^H , chloride and fluoride. This work has been carried out by taking the 10 water samples in devarajugattu village which is 7km distance from the Markapur mandal, Prakasam district – A.P., in September 2016. After getting the results, they were compared with the standard values given by WHO and ICMR. The results indicate that the fluoride in some sampling stations was found above the permissible limits probably due to contamination with sea water.

Keywords: Chloride & Fluoride Content, Devarajugattu, Markapur,

1. INTRODUCTION

Fluorides are naturally occurring substances in water which is in the form of mineral substances. If the fluorides are limited in drinking water it will be benefit to human as well as to environment and if these are in excess amount it will adversely effects the different parts of the human body like tooth enamel and which results in dental fluorosis. With the longer exposure to fluorides it may cause to bone diseases. Fluoridation is the addition of fluoride compounds into drinking water, to adjust concentrations to levels between 0.8 and 1.0 mg/lit for the beneficial effect of tooth decay prevention. The fluoride levels in ground water are changed based on the level of occurrence of water, amount of rain fall and geological formation of soil of the area.

In India, approximately 62 million people including 6 million children suffer from fluorosis because of high consumption of high Fluoride content. Statistics reveal that fluoride poisoning is more spread than the Arsenic contamination in ground water in the country.

By keeping this in view, the present work has been done for the determination of fluoride and chloride levels in groundwater in rural areas of Markapur mandal, Prakasam (Dist.), A.P., India.

2. METHODS AND MATERIAL

In this work, Water samples are collected from the following sampling stations for the analysis:

Station No	Station Name	Station No	Station Name
S1	Devarajugattu tank	S6	Gobburu
S2	Darimadugu school	S7	Jawahar nagar colony
S3	Kits college	S8	Markapur water tank
S4	Kasinayana ashramam	S9	Markapur High school
S5	Peddaraveedu	S10	Markapur town

The above samples were collected into clean water bottles by using the standard methods according to the APHA. The samples were collected at the temperature of 100C in thermometers.

In the study of physico-chemical properties such as temperature, color, pH, chloride and fluoride level different chemicals and reagents were used and tests has been carried out according to the APHA. For the determination of fluoride and chloride levels

SPANDS method is used. The chemical name of SPANDS solution is Sodium-2-(parasulfophenylazo)-dihydrox-3,6-naphthalene disulfonate in combination with zirconyl acid.

3. RESULT AND DISCUSSIONS

The results obtained for the above tests according to various parameters are given in tables - 1 to 3

4. 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 26.85-29.94 C

It is known that pH of water (6.5 to 8.9) does not have any direct effect on health. But lower value below 5.0 produce sore taste and has higher value above 8.9 are of alkaline taste. The pH values of the present

investigation were within the ICMR standards (7.0 to 8.9). Conductivity varies with the season as well as ions present in water.

5. CHLORIDE

Chloride occurs in all types of natural waters. The high concentrations of chloride are 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/lit) in SI sampling station than other stations.

TABLE 1: PHYSICO –CHEMICAL PARAMETERS OF WATER SAMPLES COLLECTED ON 1-09-2016

STATION NO	TEMPERATURE	COLOR	pH	CHLORIDE (mg/lit)	FLOURIDE (mg/lit)
S1	27.05	COLORLESS	7.20	89.11	1.22
S2	27.62	COLORLESS	7.70	86.35	1.23
S3	28.97	COLORLESS	7.89	48.62	0.81
S4	28.91	COLORLESS	8.02	45.91	0.82
S5	28.75	COLORLESS	8.10	40.64	0.55
S6	29.50	COLORLESS	7.40	75.20	1.71
S7	29.82	COLORLESS	7.57	80.50	2.00
S8	29.67	COLORLESS	8.40	88.12	1.96
S9	28.70	COLORLESS	7.07	156.01	3.01
S10	28.96	COLORLESS	7.88	124.98	1.97

6. FLOURIDE:

Fluoride in ground water is due to fluor spar, cryolite, fluorapatite and hydroxyl apatite 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 S3 & S5 higher values are obtained from S9 sampling station, where the fluoride content is (exceeded 1.5 mg/lit) above the permissible limits as prescribed by Indian standards for drinking water quality[7].

Tables -1 to 3 the determination of various parameters (the results obtained)

TABLE 2: PHYSICO –CHEMICAL PARAMETERS OF WATER SAMPLES COLLECTED ON 15-09-2016

STATION NO	TEMPERATURE	COLOR	pH	CHLORIDE (mg/lit)	FLOURIDE (mg/lit)
S1	26.57	COLORLESS	7.86	89.48	1.32
S2	26.78	COLORLESS	6.94	87.01	1.35
S3	28.96	COLORLESS	7.84	49.52	0.89

S4	29.34	COLORLESS	7.36	51.21	0.98
S5	28.04	COLORLESS	8.96	47.29	0.72
S6	29.01	COLORLESS	7.58	78.03	0.96
S7	25.74	COLORLESS	7.52	81.08	1.02
S8	29.54	COLORLESS	8.78	87.65	0.75
S9	29.31	COLORLESS	7.54	98.80	1.81
S10	28.50	COLORLESS	8.36	94.81	1.51

TABLE 3: PHYSICO –CHEMICAL PARAMETERS OF WATER SAMPLES COLLECTED ON 1-10-2016

STATION NO	TEMPERATURE	COLOR	pH	CHLORIDE (mg/lit)	FLOURIDE(mg/lit)
S1	30.15	COLORLESS	8.01	92.51	1.32
S2	29.65	COLORLESS	7.61	85.71	1.21
S3	28.35	COLORLESS	7.12	43.25	0.81
S4	28.96	COLORLESS	7.34	48.63	0.71
S5	29.63	COLORLESS	7.96	45.21	0.35
S6	29.65	COLORLESS	7.61	73.21	0.91
S7	28.65	COLORLESS	7.85	81.25	0.85
S8	29.65	COLORLESS	7.99	88.25	1.51
S9	27.85	COLORLESS	7.85	102.07	1.85
S10	30.25	COLORLESS	8.35	93.18	0.89

7. CONCLUSION

It can be concluded from 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.

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