

FLUORIDE CONCENTRATION OF GROUND WATER IN NARASARAOPET MANDAL, GUNTUR DISTRICT

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Abstract:

The present study deals with ground water analysis with respect to the fluoride content in water resources of Narasaraopet mandal Guntur districts of Ap,India.this study was carried out in year of 2017-2018 . Water samples were collected in different locations covering, open wells, tube wells and borewells. Ground waters of tube wells are highly polluted with fluoride in comparison to open wells. In view of the severity of the problem the defluoridation techniques need to be evolved to reduce or minimize the fluoride concentration in drinking water. In methodology I use the SPADNS Method. High fluoride in ground water cause health hazard. Most of the ground water samples in study area were found within the fluoride water standard. The study revealed that is the major source of fluoride in ground water and very much influenced by Fluoride levels.

KEY WORDS: GROUND WATER,FLUORIDE,SPANDNS METHOD

Introduction;

The distribution of fluoride content in the ground water of individual states is reported on the analysis of ground water quality monitoring data. Major health problems caused by fluoride are dental fluorosis **Rajashkara(2005)** (1). teeth mottling, skeletal fluorosis and deformation of bones in children as well as adults. The major chemical parameter of concern is fluoride **Rajan M R, and Paneerselvam I 2005** (2). Ground water is ultimate, most suitable fresh water resource with nearly balanced concentration of human consumption **Ayoob S,2006** (3). Over burden of the population pressure and dumping of the polluted water by various industries at inappropriate place enhance the infiltration of harmful compounds to the ground water **Subba Rao N 2005 and N. R. C 1980** [4, 5]. The high fluoride concentrations in ground water in Narasaraopet Guntur district reported by many researchers **world health organization (WHO),2006, B. K. Handa, 1975, V. K. Saxena and S. Ahmed ,2001, V. Agrawal ,1997** [6-9]. Ground water is the main source for drinking water in the areas such as Jonnalagada, chinnathurakapalem, peddathurakapalem, yalamanda,palapadu areas, in the ground water samples of narasaraopet mandal Andhra Pradesh state of India. the people have highly depend on hand pumps and jet pumps to extract ground water. From last few years it has been observed that the ground water quality of these areas has been deteriorating. The objective of this work is to assess the quality of drinking water in these areas. Groundwater is generally less susceptible to contamination and pollution when compared to surface water bodies. Also, the natural impurities in rainwater, which replenishes groundwater systems, get removed while infiltrating through soil strata. But, In India, where groundwater is used intensively for irrigation and industrial purposes, a variety of land and water-based human activities are causing pollution of this precious resource. Its over-exploitation is causing aquifer contamination in certain instances, while in certain others its unscientific development with insufficient knowledge of groundwater flow dynamic and geo-hydrochemical processes has led to its mineralization **K. Brindha 2011, J. Hussain 2010** [10,11]. Fluoride content in groundwater is mainly due to natural contamination, but the process of

dissolution is still not well understood **P. Mamatha and S. M. Rao 2010, A. Sethuraman 2013 [12,13]**. Fluoride, an electronegative element, is highly reactive, therefore, almost never occurs in elemental state in natural water. Fluoride contamination of groundwater is a growing problem in many parts of the world. High concentration of fluoride is reported both from hard rock (granites & gneisses) as well as alluvial aquifers **Chen CJ et al. (1988 [14]**. In India more than 66million people are at risk of developing fluorosis and high fluoride concentration in groundwater (greater than 1 mg/l) is widespread in the arid to semi-arid western states of Rajasthan and Gujarat and in the southern states of Andhra Pradesh, Karnataka and Tamil Nadu China.] **Beijing ,1997 [15]**.

Methodology

The study area, Narasaraopet mandal is one of the major regions in Guntur district, Andhra Pradesh situated in the south east and coastal of Andhra Pradesh, lies within the latitude – 16.2354'North and the longitude-80.0479'East The locations of sample collection were near the residential and agricultural areas. Eight sampling stations were selected for the collection of ground water for this study in the March, 2011. depends on many physico-chemical parameters and their concentrations, which are derived from laboratory tests of water samples. (**Heydari M M et al., 2013**).

Water samples were collected in clean polyethylene bottles from different sources viz. Hand pumps, open wells and other sources [**Sharma et al., 2005**]. A total of 25 water Samples per each station were collected in the selected regions in **Narasaraopet Mandal**. 25 samples are selected in narasaraopet mandal in viz., **Jonnalagadda, Chinnathurakapalem, Peddathurakapalem, Yellamanda and Palapadu**.

The water samples are analysed by SPADNS method. It involves the reaction of fluoride with a red zirconium dye solution .in the acidic medium zirconium reacts with alizarin Red-S to form violet complex,which is bleached on the addition of fluoride ion and colour changes from red violet to yellow green . 100 ml of filtered samples,then 5 ml of zirconyl acide solution was added to it for the removal of SO₄ interference, followed by the addition of Alizarin Red –S now, wait for at least one hour .Measure the intensity of light at 570 nm and calculate the concentration with the help of standard curve . The above mentioned analytical procedure is followed as prescribed by APHA.

Result:

Narasaraopetet

NAME OF VILLAGE AND SOURCE	FLUORIDE CONCENTRATION (mg/L)	Fluoride permissible Level
Jonnalagadda (Borewells)	2.06	0.8-1.0 mg/l
S.C Colony, Handpump	2.26	0.8-1.0 mg/l
Busstop, Handpump	2.34	0.8-1.0 mg/l
B.C Colony Handpump	2.47	0.8-1.0 mg/l
Near village, Borewell	2.64	0.8-1.0 mg/l
Chinnathurakapalem(borewell)	2.35	0.8-1.0 mg/l
Borewell	2.36	0.8-1.0 mg/l
Srinagar,Handpump	2.45	0.8-1.0 mg/l
Temple, Borewell	2.49	0.8-1.0 mg/l
Z.P School, Borewell	2.91	0.8-1.0 mg/l
Peddathurakapalem (Handpump)	2.39	0.8-1.0 mg/l

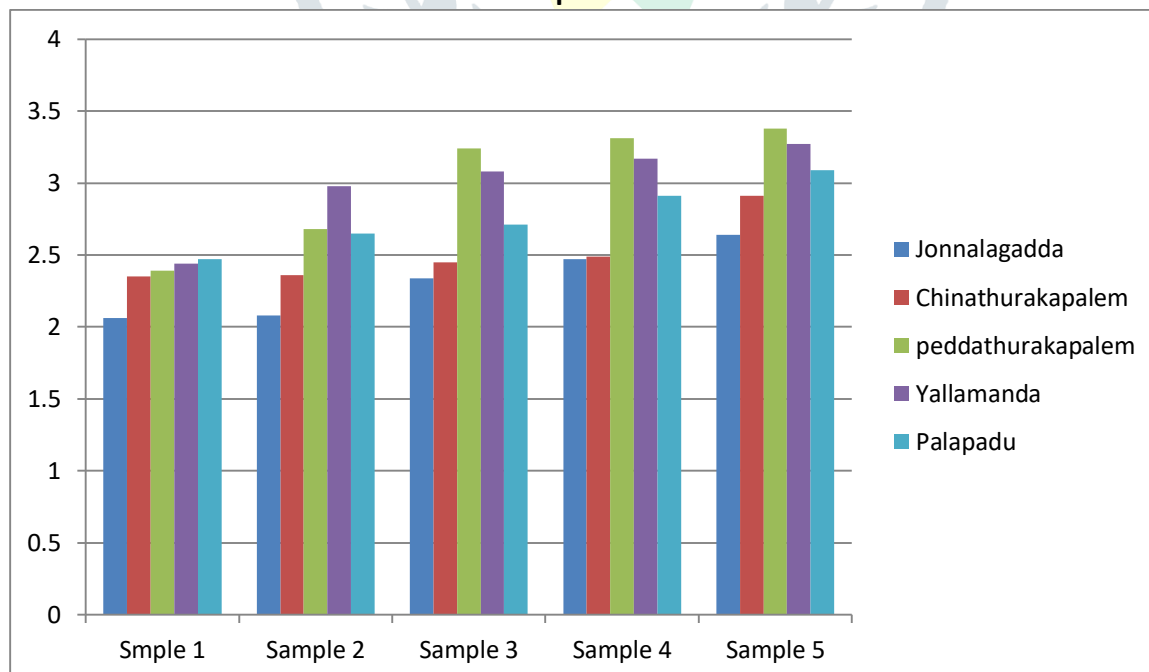
Temple, Handpump	2.68	0.8-1.0 mg/l
Sai Srinivas Road, Handpump	3.24	0.8-1.0 mg/l
NTR Nagar, Handpump	3.31	0.8-1.0 mg/l
Busstand, Borewell	3.38	0.8-1.0 mg/l
Yalamnda (Borewell)	2.44	0.8-1.0 mg/l
S.C nagar, Borewell	2.98	0.8-1.0 mg/l
High School, Openwell	3.08	0.8-1.0 mg/l
Near Village, Handpump	3.17	0.8-1.0 mg/l
Busstop, Borewell	3.27	0.8-1.0 mg/l
Palapadu (Handpump)	2.47	0.8-1.0 mg/l
S.C colony, Borewell	2.65	0.8-1.0 mg/l
M.P.U.P School, Borewell	2.71	0.8-1.0 mg/l
Water tank, Handpump	2.91	0.8-1.0 mg/l
Tank, Handpump	3.09	0.8-1.0 mg/l

Table:1 Fluoride Concentration of Narasaraopet mandal in ppm

A total 25 samples of the fluoride concentration were analysed and summarized in Table 1. The fluoride concentration ranged from 0.8 to 1.0 mg/l. Out of the 25 samples 25 samples are the Above the permissible limit. The highest fluoride levels 3.38 observed at Peddathurakapalem and lowest at Jonnalagadda and Chinnathurakapalem. The mean values of Narasaraopet mandal are 2.06.

In the study 25 samples Out of 25 samples are above than the permissible limit. Especially in Narasaraopet mandal Yellamanda and Peddathurakapalem villages is completely above than the permissible limit(3.27 and 3.38ppm).

Narasaraopet mandal



Graphical representation of fluoride concentration in Narasaraopet mandal.

Conclusion

The quality of ground water sample collected from eight different locations of Narasaraopet mandal, Guntur district analyzed and on the basis of these analytical findings, the following conclusions can be drawn. domestic and agricultural purposes. Hence, rapid and reliable monitoring measures are essential for keeping a close watch on water quality and health environment. Based on the correlation regression study, it can be concluded that all the parameters are more or less correlated with each other. The linear correlation is very useful to get fairly accurate idea of quality of the groundwater by determining a few parameters experimentally. Ground Water table level is shrinking in all the continents of the world. Agricultural lands are becoming saline. The concentration of chemicals in the groundwater is increasing making it unfit for consumption; wells may be expected to dry up ultimately leading to environmental degradation.

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