



## EFFECT OF FLUORIDE IN GROUND WATER IN ROMPICHARLA MANDAL, GUNTUR DISTRICT

**Dr. Suneetha Chatla**

Department of Environmental sciences, Acharya Nagarjuna university, Guntur, Andhra Pradesh, India.

**Dr. Pandu. Brahmaji Rao\***

Department of Environmental sciences, Acharya Nagarjuna university, Guntur, Andhra Pradesh, India. \*Corresponding Author

**ABSTRACT** Fluoride is an important water quality parameter and has beneficial effects on teeth at low concentration in Groundwater however, excessive exposure to fluoride in Groundwater, or in combination with exposure to fluoride from other sources, can give rise to a number of adverse effects. The fluoride water samples are collected from the Rompicharla mandal in Guntur district, A.P. During this year of 2017-18. The water samples are analyzed by SPADNS Method. Out of the 25 samples 25 samples are beyond the permissible limit. The highest fluoride levels 5.20 observed at Vadlamudivaripalem and lowest at Subbayapalem. The mean values of Rompicharla mandal are 2.56.

**KEYWORDS** :Groundwater, Samples, Fluoride, SPADNS Method

### Introduction

Water is the elixir of life, a precious gift of nature to the organisms. Water pollution not only affects water quality but also threatens human health, economic development and social prosperity. **Milovanovic(2007)** [1]. The groundwater is believed to be comparatively much clean and pollution free than surface water. It is used for domestic, industrial water and irrigation purposes all over the world. Rapid urbanization, especially in developing countries like India, has affected the availability of quality groundwater due to its overexploitation and improper waste disposal, especially in urban areas. **C. R. Ramakrishnaiah,(2009)** [2]. In many villages Rompicharla mandal, Guntur dist effected on fluoride water, groundwater is the source for multiple uses and is being supplied through municipality network and also from large number of private boreholes. According to the WHO, about 80% of all the diseases in human beings are caused by water. Once the groundwater is contaminated, its quality cannot be restored by stopping the pollutants from the source. Temporal changes in the origin and constitution of the recharged water, Fluorine is the lightest member of halogen group and is essential in minute quantity for normal mineralization of bone and teeth. It stimulates the growth of many plant species but on other hand if taken up in excessive amount may be toxic to plants and animals. Major health issues due to drinking fluoride contaminated water include dental fluorosis, teeth mottling, skeletal fluorosis and deformation of bone in human beings. Around 200 million people from 25 nations have health risks because of high fluoride in groundwater. In India alone about 62 million people are at risk due to incidence of dental and skeletal fluorosis. **S.K.Andezhath(1999)**, [3] According to A.P government 8,188 villages in 13 districts have excess fluoride in groundwater. **A. K. Sushela(1987)**, [5]. The main source of drinking water for Rompicharla mandal is underground water. The present supply of water by Guntur Municipal Corporation is 21 through hand pumps and deep bore wells, and the per capita water supply for the city. Guntur Municipal Corporation (GMC) has 15 wards and symptoms of dental and skeletal fluorosis in residents of some wards located in southern part of the city indicate fluoride contamination in groundwater sources in these wards and that is a major concern for the health of the people of these wards. A number of studies are available about fluoride contamination of groundwater from various parts of India and Bihar [4, 6, 7, 8, 9, 10, 11], But no systematic study has been done for fluoride mapping of groundwater sources for the area under Guntur Municipal Corporation (GMC). Keeping these points into account, the present study was undertaken to determine fluoride water analysis study that SPADNS method of fluoride contamination.

### Methodology

The Presented study was conducted in the year 2017-18 in the district of Guntur, Andhra Pradesh state in India. Guntur district, one among the 13 district of Andhra Pradesh state. It is extended over an area of 11,804 kilometers and has population of 4,887,813 (census, 2011). This district has a coast line of 100 kilometers. The Krishna river forms the north eastern and eastern boundary of the district, separating Guntur district from Krishna district. The Guntur district is bounded in

the eastern by the Bay of Bengal on the south by prakasam district, on the west by mahaboob nagar and on the north west by Nalagonda district. Guntur district is divided into 57 mandalas, which comprise the villages and hamlets.

A total 25 ground water samples were collected from borewell and open wells which used for drinking water. the samples are collected simple random sampling. in Rompicharla mandal 25 samples were selected Alawala, Vadalmudivaripalem, Vipparpalli, Subbayapalem, Thurumella in Rompicharla mandal. Samples were collected in pre cleaned polythylene bottles 1 litre.

The water samples are analyzed 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 acid solution was added to it for the removal of SO<sub>4</sub> 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

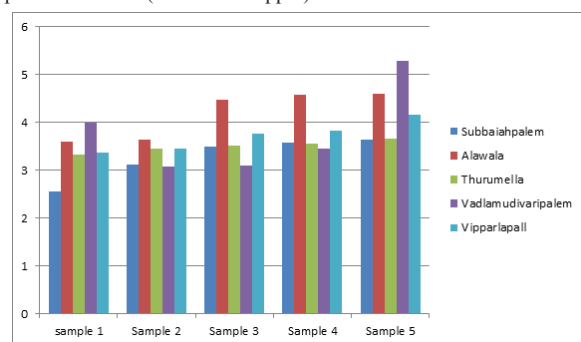
#### ROMPICHARLA MANDAL

NAME OF VILLAGE and SOURCE	FLUORIDE CONCENTRATION (mg/L)	Fluoride Standard Level
Subbairipalem (Borewell)	2.56	0.8-1.0 mg/l
Borewell	3.11	0.8-1.0 mg/l
B.C colony, Handpump	3.49	0.8-1.0 mg/l
U.P School, Borewell	3.58	0.8-1.0 mg/l
H/W School, Handpump	3.63	0.8-1.0 mg/l
Alawala (Handpump)	3.59	0.8-1.0 mg/l
Z.p.h.school, Handpump	3.63	0.8-1.0 mg/l
S.C colony, Handpump	4.47	0.8-1.0 mg/l
M.N Rao, Borewell	4.57	0.8-1.0 mg/l
K.Subbarao, Borewell	4.60	0.8-1.0 mg/l
Thurumella (Handpump)	3.32	0.8-1.0 mg/l
B.C colony, Handpump	3.46	0.8-1.0 mg/l
SK.Nagur Basha, Borewell	3.51	0.8-1.0 mg/l
Borewell	3.55	0.8-1.0 mg/l
Busstio, Borewell	3.66	0.8-1.0 mg/l
Vadlamudivaripalem (Handpump)	3.99	0.8-1.0 mg/l

Municipal school, Handpump	3.08	0.8-1.0 mg/l
Handpump	3.09	0.8-1.0 mg/l
M.N Rao, Borewell	3.46	0.8-1.0 mg/l
S.C colony, Handpump	5.29	0.8-1.0 mg/l
Vipparlapalli (Borewell)	3.36	0.8-1.0 mg/l
School, Borewell	3.46	0.8-1.0 mg/l
Village, Handpump	3.77	0.8-1.0 mg/l
Water tank, borewell	3.83	0.8-1.0 mg/l
Handpump	4.17	0.8-1.0 mg/l

A total 25 samples of the fluoride concentration were analyzed 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 5.20 observed at Vadlamudivaripalem and lowest at Subbayapalem. The mean values of Rompicharla mandal are 2.56.

In the study 25 samples out of 25 samples are above than the permissible limit. Especially in Rompicharla mandal Alawala and Vadlamudivaripalem villages is completely above than the permissible limit (2.56 and 5.29 ppm).



### Graphical representation of fluoride concentration in Rompicharla mandal.

### Conclusion

For the determination of fluoride concentration in the Rompicharla area 25 samples are collected from different locations and analyzed by ion selective meter. From the data it was observed that in fourteen samples fluoride concentration was above WHO (World Health Organization) permissible limits. The highest and lowest fluoride concentration in the study area is 5.29 mg/L and 2.56 mg/L respectively. It was observed that 93% of samples exceed the maximum permissible limit which shows the severity of the problem. In the fluoride-affected areas, both children and adults suffer from health disorders like mottling of teeth, deformation ligaments, bending of spinal column and ageing problem. It is finally concluded that the Rompicharla mandal area need a sound Fluoride

### REFERENCES

- [1] M. Milovanovic, Water quality assessment and determination of pollution sources along the Axios/Vardar River, Southeastern Europe, *Desalination*, 213, 2007, 159-73.
- [2] C. R. Ramakrishnaiah, C. Sadashivaiah and G. Ranganna, Assessment of Water Quality Index for the Groundwater in Tumkur Taluk, Karnataka State, India, *E Journal of Chemistry*, 6(2), 2009, 523-530.
- [3] S. K. Andezhath, A. K. Susheela and G. Ghosh, Fluorosis management in India: The impact due to networking between health and rural drinking water supply agencies, (IAHS-AISH Publication, 1999) 260, 159-165.
- [4] K. Brindha, R. Rajesh, R. Murugan and L. Elango, Fluoride contamination in groundwater in parts of Nalgonda District, Andhra Pradesh, India, *Environ Monit Assess* 172, 2011, 481-492.
- [5] A. K. Susheela, Fluorosis in India, the magnitude and severity of the Problem, *Sci Dev Env*. 1987, 147-157.
- [6] S. Das, B. C. Mehta, P. K. Das and S. K. Srivastava, Fluoride Hazards in Groundwater of Orissa, India, *Indian Environ Hlth* (1), 2009, 40-46.
- [7] R. Agrawal and T. I. Khan, Groundwater quality and Fluoride content in Sikariteshil of Dausa District, *The Ecoscan* 4(2&3), 2010, 225-226.
- [8] S. Yasmin, S. Monterio, P.A. Ligimol and , Fluoride contamination and fluorosis in Gaya Region of Bihar, India, Patna, Bihar, India, *Current Biotica* 5(2), 2011, 232-236.
- [9] T. Ramachandramoorthy, V. Sivasankar and R. Gomathi, Fluoride and other parametric status of groundwater samples at various locations of the Kollu Hills, Tamilnadu, India, *J. IPHE, India*, (3), 2008, 50-56.
- [10] A. K. Jha and U. Kumar, A case study of arsenic and fluoride contamination in groundwater of Bhagalpur District, *Journal of Chemical and Pharmaceutical Research*. 6(11), 2014, 735-738.
- [11] N. N. Jha, S. N. Poddar, T. N., Mandal and A. K. Sinha, Fluoride content in groundwater and fluorosis in Human population in Katihar District of North Bihar, India, *Fresh water Biol*. 9(2), 1997, 98-100.