# FLUORIDE CONCENTRATION IN GROUND WATER IN NADENDLA MANDAL, GUNTUR DISTRICT

Dr. Suneetha Chatla[1], Dr.Pandu.Brahmaji Rao [2],
Department of Environmental sciences, Acharya Nagarjuna university
Guntur, Andhra Pradesh, India.

## Abstract

The survey was conducted in Nadendla mandal, Guntur district are highlighted in Fluoride contamination. The Groundwater is the primary source of drinking water in this area and very few people are fed with water supply scheme. They have fluoride bearing minerals which are leached out to the groundwater and contribute high fluoride concentration in the groundwater. Total fifteen water samples are collected from different locations. This study used in SPADNS method. Fluoride levels in 93% of samples exceed the maximum permissible limits (1.5 mg/L). The observed Fluoride levels in this area range from 2.31–4.85 mg/L with an average of 2.07 mg/L. The high fluoride levels may lead to morbidity of dental fluorosis .It is finally concluded that the Nadendla mandal need a sound Fluoride management plan and the removal of fluoride from drinking water is advisable.

**Keywords:** Contamination; Fluoride; Groundwater; SPADNS method.

# Introduction:

The main source of fluoride in groundwater is rich in fluoride. Most of the people affected by high fluoride concentration in groundwater live in the tropical countries where the per capita consumption of water is more because of the prevailing climate **Briinda K[1]**. Some Villages are heavily affected with fluorosis **Agarwal (1997),)[2,3].**Similarly, the Nadendla mandal is rich with fluoride which forms the major reason for fluoride contamination in groundwater **Briinda et,al [4]**, and the fluoride in the district of Guntur, Andhra Pradesh contain much higher fluoride than the world average fluoride concentration of 810 mg/kg **Yadav S(1999))[5**]. Fluorine is often called as two-edged sword. Prolonged ingestion of fluoride through drinking water inexcess of the daily requirement is associated with dental and skeletal Fluorosis. Similarly, inadequate intake of fluoride in drinking water World Health Organization (WHO) has set the upper limit of fluoride concentration in drinking water at 1.5 mg/l **Andezhath(2000),[6],** and The Bureau of Indian Standards, has therefore, laid down Indian standards as 1.0 mg/l as maximum permissible limit of fluoride with further remarks as "lesser the better" [7]. Intake of fluoride higher than the optimum level is the main reason for dental and skeletal fluorosis. The most effective tools to communicate information on overall quality status of water to the concerned user community and policy makers **(Chopra .S.L. and Anwar, J.S, 1999)(8)**. Thus, it becomes an important parameter for the assessment and management of ground water. Though fuoride enters the body through water, food, industrial exposure, drugs, cosmetics, etc., drinking water is the major source (75%) of daily intake. **Sarala, K. and Rao P.R (1995) [9]** Due to its strong electronegativity, fluoride is attracted to positively charged calcium in teeth and bones. Major health problems caused by fluoride are dental fluorosis, teeth mottling, skeletal fluorosis and deformation of bones in children as well as adults. **Susheela, A.K., Kumar (1993) [10]** Excess fluoride affects plants and animals also.

## Methodology:

The Nadendla mandal of Guntur District of Andhra Pradesh, India occupies an area of 37 km² and has a population of 61,906 are rural. It is the largest in area among the agriculture of Guntur districts. The coordinates of the Nadendla 16°10′30″N 80°11′10″E (Figure-1); the average elevation (above msl) is10 m (30ft). Nadendla Mandal is bounded by by Narasaraopeta Mandal towards west , Edlapadu Mandal towards East , Phirangipuram Mandal towards North , Chilakaluripet Mandal towards South . Narasaraopet City , Chilakaluripet City , Sattenapalle City , Guntur City are the nearby Cities to Nadendla. groundwater contamination in the study areas. covering entire nadendla during the year of 2017-18.

A total 25 ground water samples were collected from bore wells and open wells used for drinking water. The samples are collected simple random sampling in Nadendla mandal total 30 samples were selected( Sathuluru, Kanaparru, Chirumamilla, Endugapalem, Mallayapalem) samples were collected in precleaned polyethylene bottle of 1 liter

The water samples are analyzed by SPANDS 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 removel 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

### Nadendla mandal

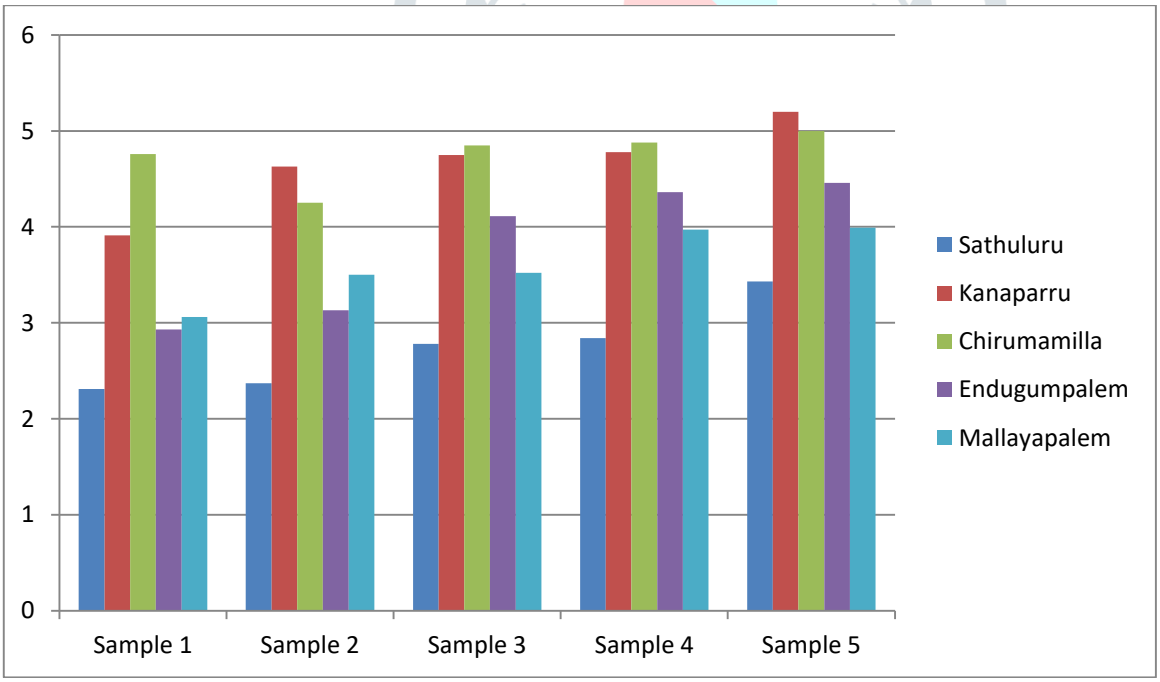
| Name of the Village and sources | Fluoride Concentration(mg/l) | Fluoride Standard level |
|---|---|---|
| **Sathuluru(Borewell)** | **2.31** | **0.8-1.0 mg/l** |
| Sri Colony, Borewell | **2 .37** | **0.8-1.0 mg/l** |
| S.C Colony Handpump | **2.78** | **0.8-1.0 mg/l** |
| S.T colony, Handpump | **2.84** | **0.8-1.0 mg/l** |
| Nivas colony, Borewell | **3.43** | **0.8-1.0 mg/l** |
| **Kanaparru (Borewell)** | **3.91** | **0.8-1.0 mg/l** |
| Z.P.H.S Handpump | **4.63** | **0.8-1.0 mg/l** |
| Busstop (Borewell) | **4.75** | **0.8-1.0 mg/l** |
| M.P.P School,Borewell | **4.78** | **0.8-1.0 mg/l** |
| Venkaya cly Borewell | **5.20** | **0.8-1.0 mg/l** |
| **Chirumamilla (Borewell)** | **4.75** | **0.8-1.0 mg/l** |
| Busstop, Handpump | **4.25** | **0.8-1.0 mg/l** |
| S.T Cly, Handpump | **4.85** | **0.8-1.0 mg/l** |
| O.C Colony, Handpump | **4.81** | **0.8-1.0 mg/l** |

| | | |
|---|---|---|
| B.C Cly, Borewell | **4.46** | **0.8-1.0 mg/l** |
| **Endugumpalem (Borewell)** | **2.23** | **0.8-1.0 mg/l** |
| Busstop(Borewell) | **3.13** | **0.8-1.0 mg/l** |
| M.P.U.P school(b.w) | **4.11** | **0.8-1.0 mg/l** |
| Temple, Handpump | **4.36** | **0.8-1.0 mg/l** |
| High School, Handpump | **4.46** | **0.8-1.0 mg/l** |
| **Mallayapalem (handpump)** | **3.06** | **0.8-1.0 mg/l** |
| Temple, Borewell | **3.50** | **0.8-1.0 mg/l** |
| MPES, Borewell | **3.52** | **0.8-1.0 mg/l** |
| Bus stop, Handpump | **3.97** | **0.8-1.0 mg/l** |
| ELE School Handpump | **3.99** | **0.8-1.0 mg/l** |

**Table:1 Fluoride Concentration of Nadendla mandal in ppm**

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 Kanaparru and lowest at Sathuluru and Endugumpalem. The mean values of Nadendla mandal are 2.23.

In the study 25 samples out of 25 samples are above than the permissible limit. Especially in Nadendla mandal Kanaparru and Chirumamilla villages is compeletely above than the permissible limit(2.23 and 5.20ppm).




Graphical representation of fluoride concentration in Nadendla mandal.

**Conclusion:**

The fluoride content is beyond the limit prescribed by standards. Since drinking water is a basic need, the people should consume protected water containing fluoride within the prescribed limits. Hence the future

generations in these areas have to take necessary steps to protect themselves from attacking dental and skeletal flurosis.

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