

# FLUORIDE DISTRIBUTION IN DRINKING WATER ANALYSIS IN MANGALAGIRI MANDAL, GUNTUR DISTRICT

*Dr. Suneetha Chatla<sup>1</sup>, Dr.Pandu.Brahmaji Rao<sup>2</sup>,*

Department of Environmental sciences, Acharya Nagarjuna university

Guntur, Andhra Pradesh, India.

## Abstract:

Ground water systems are dynamic and that is not available and not suitable for drinking purpose in all regions of the world, so it is very precious, the ground water samples are collected from different locations mangalagiri mandal, Guntur district, and Andhra Pradesh, India. The work was carried out in the year of 2017-2018.in methodology I use the SPANDNS Method. A total 30 ground water samples were collected from bore wells and open wells used for drinking water. In the study 30 samples are above then the permissible limit. Especially in mangalageri mandal . yerrabalam village is completely above than the permissible limit (5.34 PPM) and kaza is also above than the permissible limit (4.29ppm). Overall water quality was found unsatisfactory for drinking purposes without any prior treatment.

**KEY WORDS:** GROUND WATER, SPANDNS METHOD, PERMISSIBLE LIMIT.

## Introduction:

Fluorine is a naturally occurring element that does not occur in the elemental state in nature because of its high reactivity. It accounts for about 0.3 g/kg of the Earth's crust **WHO Guidelines for drinking water quality (1996)**. The amount of fluoride present naturally in drinking-water is highly variable, being dependent upon the individual geological environment from which the water is obtained. In areas rich in fluoride-containing minerals, boring water may contain up to about 10 mg of fluoride per litre **US EPA (1985)**. Large numbers of Indians rely on groundwater for drinking purposes and at many places this groundwater is rich in fluoride. Although fluoride is beneficial when consumed in recommended doses but excess intake may cause fluorosis including dental, skeletal and non-skeletal fluorosis along with secondary neurological complications **Indermitte E(2007),Lineswara Rao sv (2003),Rajkumari KR and rao RM(1985),Susheela AK(1993)**. In India 62 million people including 6 million children are estimated to have serious health problems due to consumption of fluoride contaminated water **Susheela AK(2001),Arlappa N,et. al,(2013),Kotecha PV, et.al,(2012)**. The main source of Fluoride in humans is drinking water.

Although drinking water is usually the largest contributor to the daily fluoride intake of humans but Fluoride is also found in vegetables, fruit, tea and other crops. The WHO guideline value for fluoride is 1.5mg/litre, with a target of between 0.8–1.2mg/l to maximize benefits and minimize harmful effects. Acceptable levels depend on climate, volumes of water intake and the likely intake of fluoride from other sources **Samal UN and naik BN(1988)**.Presently, seventeen Indian states have

been identified as having excess fluoride in drinking water [6]. In Rajasthan, people of 22 districts are consuming fluoride greater than permissible limit **APHA(2005) (American Public Health Association)**. Usually, the surface water does not contain as high fluoride as groundwater because the usual source of fluoride is fluoride rich rocks. When water percolates through rocks, it leaches out the fluoride from these rocks. Therefore major source of Fluoride in the groundwater is leaching from earth crust. In India due to lack of central water supply in most of the country, groundwater is being used for drinking purposes. Fluoride levels in drinking water are also found to be

low or normal in certain areas. Unfortunately, proper fluoride mapping has not been carried in Mangalagiri mandal so as to locate areas with normal, low, or high levels of fluoride. Scanty work has been reported on the drinking water quality of mangalagiri mandal Guntur district, Ap. with special focus to Fluoride. Hence in order to fill this gap the present work was initiated. The present paper analyzes the fluoride content of drinking water in mangalagiri mandal and its probable effect on the health of the population.

## Materials And Methods

The Present study was conducted in the year 2018 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 30 ground water samples were collected from bore wells and open wells used for drinking water. The samples are collected simple random sampling .in mangalageri mandal total 30 samples were selected( kaza,chinnakakani,nidamaru,yarrabalem,nowluru,bethapudi) samples were collected in preleased 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 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.

### RESULTS: MANGALAGIRI MANDAL

NAME OF THE VILLIGE	FLORIDE CONCENTRATION (mg/L)	Fluoride permissible (0.8-1.0 mg/L) limit
<b>KAZA</b> MPP SCHOOL(BOREWELL)	2.04	0.8-1.0 mg/l
BC COLONY (HANDPUMP)	2.12	0.8-1.0 mg/l
ZPH SCHOOL (BOREWELL)	2.39	0.8-1.0 mg/l
OC COLONY (HANDPUMP)	3.33	0.8-1.0 mg/l
SC COLONY ( HANDPUMP)	4.29	0.8-1.0 mg/l l
<b>CHINNAKAKANI</b> ST COLONY(BOREWELL)	2.01	0.8-1.0 mg/l
MPP SCHOOL (HANDPUMP)	2.12	0.8-1.0 mg/l
BUS STOP (HANDPUMP)	2.38	0.8-1.0 mg/l
OC COLONY (BOREWELL)	2.56	0.8-1.0 mg/l

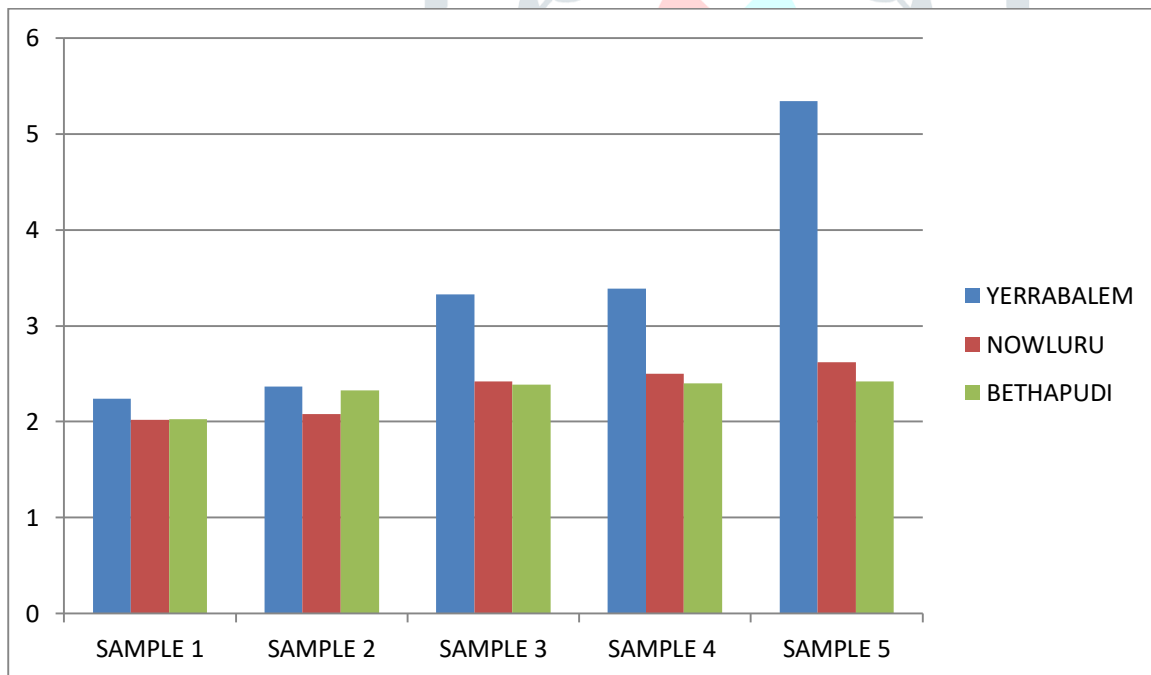
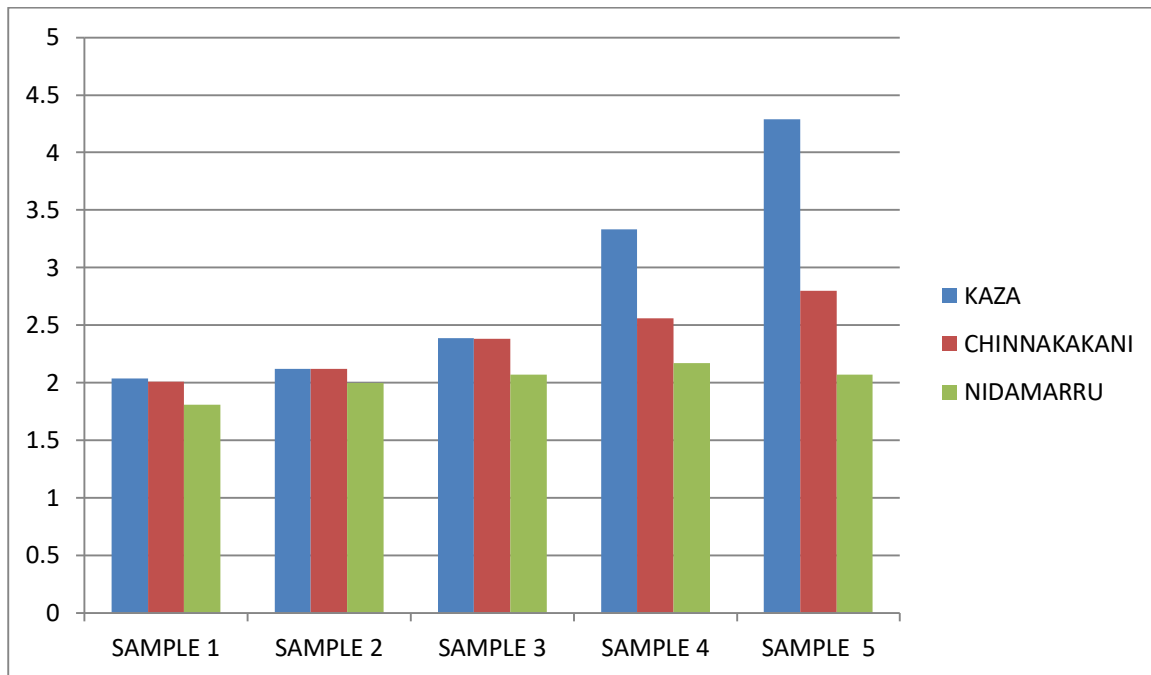
BC COLONY (BOREWELL)	2.80	0.8-1.0 mg/l
<b>NIDAMARRU</b> BUS STOP (BOREWELL)	1.89	0.8-1.0 mg/l
NEAR VILLAGE (HANDPUMP)	2.00	0.8-1.0 mg/l
MPP SCHOOL (BOREWELL)	2.07	0.8-1.0 mg/l
SVR COLONY (HANDPUMP)	2.17	0.8-1.0 mg/l
SC COLONY (BOREWELL)	2.07	0.8-1.0 mg/l

NAME OF THE VILLIGE	FLUORIDE CONCENTRATION (mg/L)	Fluoride permissible ( 0.8-1.0 mg/L) limit
<b>Yarrabalem</b> OC COLONY (HANDPUMP)	2.24	0.8-1.0 mg/l
TEMPLE STREET (BORE WELL)	2.37	0.8-1.0 mg/l
ZPH SCHOOL (HANDPUMP)	3.33	0.8-1.0 mg/l
BUS STOP(BOREWELL)	3.39	0.8-1.0 mg/l
SR NAGAR (HANDPUMP)	5.34	0.8-1.0 mg/l
<b>Nowluru</b> NEAR VILLAGE (HANDPUMP)	2.02	0.8-1.0 mg/l
BUS STOP(HANDPUMP)	2.18	0.8-1.0 mg/l
NTR COLONY (BOREWELL)	2.42	0.8-1.0 mg/l
BC COLONY (HANDPUMP)	2.50	0.8-1.0 mg/l
BUS STOP (BOREWELL)	2.62	0.8-1.0 mg/l
<b>Bethapudi</b> SRINIVAS NAGAR(BOREWELL)	2.03	0.8-1.0 mg/l
ZPH SCHOOL (HANDPUMP)	2.33	0.8-1.0 mg/l
SW SCHOOL (BOREWELL)	2.39	0.8-1.0 mg/l
TEMPLE STREET (HAND PUMP)	2.40	0.8-1.0 mg/l
SRI NAGAR (BOREWELL)	2.42	0.8-1.0 mg/l

**TABLE 1. FLUORIDE CONCENTRATION OF MANGALAGERI MANDAL IN PPM**

The total 30 samples of the fluoride concentration were analyzed and summarized in the TABLE 1 . the fluoride concentration ranges from 2.00 to 5.34 mg/L .out of the 30 samples 30 samples are the above than the permissible limit . the highest fluoride levels 5.34 observed at yarrabalam and lowest at chinnakakani .

In the study 30 samples are above than the permissible limit. Especially in mangalageri mandal yerrabalam village is completely above than the permissible limit (5.34 PPM) and kaza is also above than the permissible limit (4.29ppm)the result of the mangalageri mandal is represented in the graphs as follows.



**GRAPHICAL REPRASENTION OF FLUORIDE CONCENTRATION MANGALAGIRI MANDAL**

**Conclusion:**

The quality of ground water samples collected from mangalageri mandal (kaza, chinnakakani, nidamarru,yarrabalam,nowlurubethapudi) Guntur,Andhra pradesh. since the occurrence of low fluoride ion concentrations in ground water is not a national problem fluoridation of ground water is not advisable alternatives to water fluoridation should be looked into for such areas. all samples has high value above permissible limit. The fluoride content is very high in all samples it effect to the bones and teeth the. general

observation is that the samples water from Mangalageri Mandal required to treatment before consumption. we can conclude 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 ground water by determining a few parameters experimentally

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