ANALYSIS OF FLUORIDE CONCENTRATION IN YERRAGONDAPALEM, PRAKASAM DISTRICT

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Abstract

Fluoride Water is one of the most effective public health programs of the past century. However, efforts to extend water fluoridation into currently non-fluoridated areas are often the fluoride. Despite considerable evidence regarding the effectiveness of water fluoridation at an individual level. The study conducted by Yerragondapalem mandal,Prakasam district,. During year of 2017-2018.in this analysis SPADNS Method is used. . In the present study, it is observed that groundwater samples collected from Some villages in Yerragondapalem Mandal.

Keywords : Groundwater,samples, spadns method, Fluoride.

Introduction:

Fluoride is a naturally occurring element found in certain igneous and metamorphic rocks. It can be introduced to the environment through natural erosive processes or land disturbances associated with construction and land development **Gautam R, et. al,(2010).** Usually found in low concentrations in surface and groundwater sources, fluoride is sometimes added to drinking water to help prevent tooth decay in children. Fluoride can be toxic at high concentrations (approximately 5 mg/l or higher); however, additions to drinking water rarely exceed 1.5 to 2 mg/l. Concentrations greater than 2 mg/l can result in tooth discolorations and mottling, and, in excessive dosages, skeletal abnormalities. Abnormal levels of fluoride in water are common in fractured hard rock zone with pegmatite veins. It occurs in the earth crust along with the fluoride rich mineral bearing rocks. Minerals like topaz, fluorite, fluor-apitite, villuamite, cryolite and fluoride replaceable hydroxide ion in ferromagnesium silicates contribute to fluoride in groundwater **Raghavachari S, et.al,(2008).** Fluoride ions of these minerals leach in to groundwater and contribute to the high fluoride concentrations. Minerals such as muscovite and biotite (Mica group) contribute to water fluoride content **Institute of medicine ,(1997).** Fluoride presence in the groundwater and its regional dispersion is mostly due to major fluoride – bearing minerals, such as, fluorspars (fluorite), rock phosphate (apatite, thiroapatite, triplite, etc) and phosphoritesThe variation of fluoride concentration in groundwater samples may be due to irregular distribution of rocks **Devotta, et. al, (2007).** Due to its strong electronegativity, F^- is attracted by positively chargedcalcium ions in teeth and bones and hence excessive intake can results in pathological changes in teeth and bones, such as mottling of teeth or dental fluorosis followed by skeletal fluorosis **Driscoll, et. al,(1988),Ericsson Y, et. al,(1969).** In India, fluoride is one of the most undesired elements present in groundwater extracted for drinking purposes in many,areas,**Oeleschlaeger,(1970),Raghavachari,(2008),Ramteke,(2007),RGNDWM,(1993),Selvapathy,et.al,(1995),Sengnpta, et.al,(1937).** In drinking water the permissible limit of fluoride is 1.5mg/l **Clasen,et. a,(2003).**

Methodology:

The Present study was conducted in the year 2017-18 in the district of Prakasam, Andhra Pradesh state in India. Prakasam district, one among the 13 district of Andhra Pradesh state. It is extended over an area of 17,626 kilometres and has population of 3,392,764 (census,2011).The Prakasam district is bounded in the

eastern by the Bay of Bengal, on the south by kadapa and Nellore district , on the west by Kurnool and on the north west by Mahabubnagar district of Telangana. Prakasam district is divided into 56 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 Yerragondapalem mandal samples were selected Vadampalli, Sarvayapalem, Mittagoduthanda, Gollavidipu, Amanagudipadu in Yerragondapalem mandl.Samples were collected in precleaned polyethylene bottles 1 litre.

The water samples are analysed 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 ;

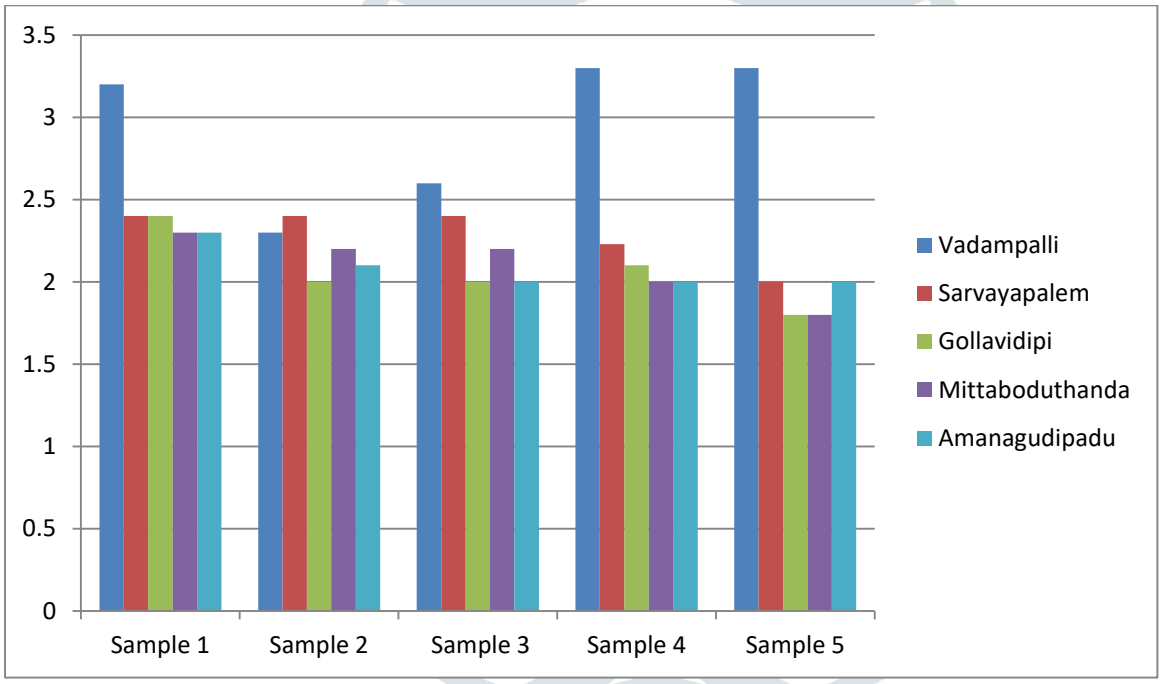
YERRAGONDAPALEM MANDAL

NAME OF THE VILLAGE AND SOURCES	FLUORIDE CONCENTRATION (mg/L)	Fluoride permissible (0.8-10 mg/l)
Vadampalli (Borewell)st colony	3.2	0.8-1.0 mg/l
Mpp school(Borewell)	2.6	0.8-1.0 mg/l
Oc colony(Borewell)	2.3	0.8-1.0 mg/l
Sc colony(Handpump)	2.4	0.8-1.0 mg/l
Bc colony(Handpump)	2.3	0.8-1.0 mg/l
Sarvayapalem(Bw)bus stop	2.4	0.8-1.0 mg/l
Sc colony(Handpump)	2.4	0.8-1.0 mg/l
Zph schoolHandpump	2.2	0.8-1.0 mg/l
Oc colonyBorewell	2.2	0.8-1.0 mg/l
Bc colonyBorewell	2	0.8-1.0 mg/l
Gollavidipi (Hp)temple	2.4	0.8-1.0 mg/l
Yadav colonyHandpump	2	0.8-1.0 mg/l
Mpp schoolHandpump	2	0.8-1.0 mg/l
Oc colonyHandpump	2.1	0.8-1.0 mg/l
Bus stop Borewell	1.8	0.8-1.0 mg/l
Mittaboduthanda(HP**)**st colony	2.3	0.8-1.0 mg/l
Mpp schoolBorewell	2.2	0.8-1.0 mg/l
Raju colonyHandpump	2.2	0.8-1.0 mg/l
SaraBai colonyHandpump	2	0.8-1.0 mg/l
Bus stop Borewell	1.9	0.8-1.0 mg/l
Amanigudipadu(BW)bus stop	2.3	0.8-1.0 mg/l
Mpp schoolHandpump	2.1	0.8-1.0 mg/l

Zph school Borewell	2	0.8-1.0 mg/l
Sc colony Borewell	2.2	0.8-1.0 mg/l
Bc colony Borewell	1.8	0.8-1.0 mg/l

A total 25 samples of the fluoride concentration were analysed and summarized in Table 1. The fluoride concentration ranged from 1.8 to 3.2 mg/l. out of the 25 samples 25 samples are the above than the permissible limit. The highest fluoride levels 3.2 observed at Vadampalli and lowest at Amanigudipadu and Mittaboduthanda. The mean values of Yerragondapalem mandal are 1.8.

In the study 25 samples are in the permissible level and 25 samples are above than the permissible limit. Especially in Yerragondapalem mandal Vadampalli and Sarvayapalem villages is completely above than the permissible limit(3.2 and 3.38ppm).



Graphical representation of fluoride concentration in Yerragondapalem mandal.

CONCLUSION

Fluoride fluctuations in the study area were collected in groundwater samples of especially from Vadampalli and Amanigudipadu villages. It is observed that due to being near to, the fluoride concentration decreased in ground water sample from , whereas in Yerragondapalem groundwater sample,. Also at higher fluoride concentration, However with the available data, it can be predicted that of fluoride rich minerals present in Fluoride levels may be the cause for presence of excess fluoride in some of the groundwater samples.

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