

GROUNDWATER QUALITY WITH SPECIAL REFERENCE TO FLUOROSIS OF KONGHARA DHARANA REGION, DISTRICT YAVATMAL MAHARASHTRA, INDIA.

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Abstract: Ground water analysis has been carried out in Konghara and Dharana using hydrogeological analysis aspects in a systematic way by utilizing various computer aided programs and statistical techniques. This study will also provide first hand information on fluorosis problem and geology of the study area. This study will also provide the knowledge about the hydrogeology of the area. Fluorosis disease comes from the increasing percentage of fluoride minerals present in the rocks. People use the water to the drinking purposes through the drinking percentage of fluoride increases into the body and results into the fluorosis. For the knowing the origin or source of the fluorosis problem it is very important to know about the geology and hydrological properties of the rocks.

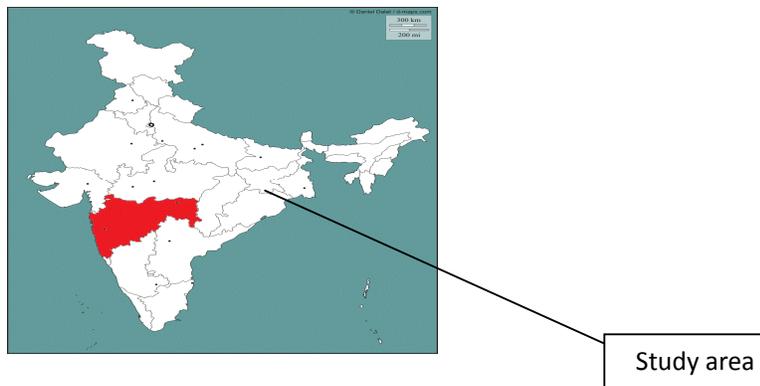
Keywords: Water quality, Fluoride, Groundwater, Contamination and remedial measures.

Introduction

In Yavatmal, bordering Andhra Pradesh, incidence of fluorosis has been raising in recent years alongside the mindless extraction of groundwater. Lack of rainfall has meant that the district is largely dependent on groundwater, both for irrigation and drinking water requirements. Incessant digging of bore wells has given rise to sharp rise in the fluoride concentration in the ground water. Fluorides and other dissolved salts in drinking water have exceeded the safe limit in the past two decades. A high intake of fluoride (>1.5 mg/l) in drinking water over a prolonged period is known to cause damage to the enamel of the teeth, and eventually results in skeletal complications leading to fluorosis.

Study Area

The area under study falls in Yavatmal district, in Pandharkwada Tq. situated in S-E part of the Yavatmal city nearly 70 km. away. The longitude of study area is 78° 32' to 78° 36' and latitude is 20° 04' to 20° 08' which include in map of survey of India toposheet No. 55 L/12. The village Konghara and Dharana lie in the way of Yavatmal to Wani road. The study area lies in adjoining to the Konghara. The villages are as follows -Dharana, Sakhara, Sakhi, wadhona,



General Geology of the area

The study area comes under Yavatmal dist. of Maharashtra. It includes Deccan trap basalt. The visually interpreted geological frame work of the area comprises of Archean gneisses, Gondwana sequence and basaltic flows. The generalized stratigraphic succession of the area is as below:

Age	Group	Formation	Lithology
Quaternary			Alluvium
Cretaceous to Paleocene	Sahyadri Group	Karanja formation	2 to 5 flows (160m thick)
			Aa flows (50m thick)
		Chikhli formation	11 aa and 1 compound flows(90m thick)
		Ajanta formation	5 aa and 9 pahoehoe flows (154m thick)
Permian to Triassic	Gondwana Super group	Moture Formation	Sandstone

Previous Work

The area is previously worked by Geologists. Shri. A. B. Wadaskar, senior Geologist (inch.) officer of senior Geologist, Ground water Surveys and Development Agency, Awdhootwadi, Tiwari Chowk, Yavatmal. He has experience of 23 years in Hydro geological mapping and groundwater prospecting. Also, dealing with PWSS source strengthening by conventional and unconventional method under Shivkalin Pani Sathwan Yojana. Another geologist is Shri. A. M. Mitkari, Asst. Geologist, office of senior Geologist, GSDA Yavatmal. He has experience of 28 years in Hydro geological mapping and ground water prospecting and carried out surveys in different hydro geological terrain. Also, deal with PWSS source and strengthening by conventional and unconventional method under Shivkalin Pani Sathwan Yojana.

Methods of study

The method of work can be divided in two works. First is field work and another is laboratory work. The field works have been done in month of May- June in Pre Monsoon. The samples were collected in bottled and sealed in air tight. After collecting the samples we have to do chemical analysis in our department's laboratory, Such as Alkalinity, Acidity, Chloride, Calcium, Hardness, Magnesium, Fluoride. The duration of working was from 7.00 am to 5 pm first we selected the wells from the village. Collect the sample from well, after completion of well inventory data followed by physical quality parameter analyzed collected

Sr. No.	Village	source	Well location	Ph	TEMP. Mg/l	Alkalinity Mg/l	Hardness Mg/l	Calcium Mg/l	Fluoride Mg/l
1	Konghara	BW	Near, Bhaskar Uike home.	7.3	28.3	46	208	30	2
2	Konghara	BW	Hanuman Mandir	7.5	29.5	38	210	25	2.1
3	Konghara	BW	Near. Floor mill	7.8	30.8	40	260	34	1.8
4	Konghara	BW	Near neem tree	7.2	27.2	44	375	45	2.2
5	Konghara	DW	Near Tiwasabai Gedam	7.4	27.4	40	315	55	1.4
6	Dharana	BW	School campus	7.7	28.7	44	340	52	2.4
7	Dharana	BW	In front of vet. clinic	7.1	26.1	48	210	40	1.8
8	Dharana	DW	On highway	7.5	29.5	44	320	55	1.6
9	Dharana	DW	Vasantrao Dhande	7.2	26.6	50	290	54	1.8
10	Dharana	BW	Vilas Patil	7.1	28.5	40	250	60	1.7

water sample at Khongara and Dharna. Results after the hydrochemical analysis of water sample is given below in table.

Result and Discussion

From the above project various conclusions are derived by our experiences during the field work.

1. Fluoride is present in surface water as well as in subsurface water in the study area Of Yavatmal district.
2. Fluoride is presence due to fluoride content minerals occurring in soil and rock in the area.
3. Fluorite (CaF_2) a common fluoride bearing mineral is present in the Precambrian crystalline in sedimentary rocks of the area.
4. Fluorite generally occurs in irregular bedding replacement deposits especially in limestone.
5. The apatite ($\text{Ca}_3 \text{P}_2\text{O}_3 \text{CaF}_2$) Occurs in the form of crystals grain in basic igneous rocks such as basalts.
6. Sometimes fluoride concentrates in pegmatitic metallic vein and magmatic intrusion in the Precambrian basement.
7. It also occurs in metamorphic rock i.e. schist and gneisses.
8. The study area is covered by Flows belonging to Deccan traps, the shallow Precambrian basement.
9. It is speculated that the circulating groundwater from the basement into the shallow aquifer is responsible for the concentration of fluorite in the groundwater sources of the area.
10. Dental fluorosis is occurring due to increasing percentage of fluoride in water.
11. PH value of water sample is higher in Konghara is 7.8mg/lit found in study area which is located near floor mil.
12. Alkalinity value of water sample is higher in Dharana is 50mg/lit found in study area which is located near Vasantarao Dhande.
13. Ca value of water sample is higher in Dharana is 60mg/lit found in study area which is located near Vilas Patil.
14. Chloride value of water sample is higher in Konghara is 240mg/lit found in study area which is located near neem tree.
15. Fluoride value of water sample is higher in Dharana is 2.4mg/lit found in study area which is located in school campus.

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