



## RESEARCH ARTICLE

## Assessment of physico-chemical properties of ground water from different villages of Shirala Taluka, Sangli District (India)

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### Abstract

The unregulated human activities and excessive use of fertilizer, the natural water resources are degraded exponentially. The present study focused on pH, TDS, fluoride and nitrate content in the drinking water of different villages of Shirala Taluka, Sangli District. The water samples were collected from hand pump and used for present investigation. The results obtained are compared with standard of WHO and BIS specifications. The range of physiochemical parameters were observed pH (6.6-9.2), Total Dissolved Solids (130-1960 mg/l), fluoride (0.8-1.9 mg/l) and nitrate (0.77-117.39 mg/l) during present investigation. The result revealed that most of water samples were exceeds limits of WHO (2006). Thus, water quality was found unsatisfactory for drinking purpose without any prior treatment.

Key words- Fluoride, Nitrate, Drinking water, Shirala, Sangli

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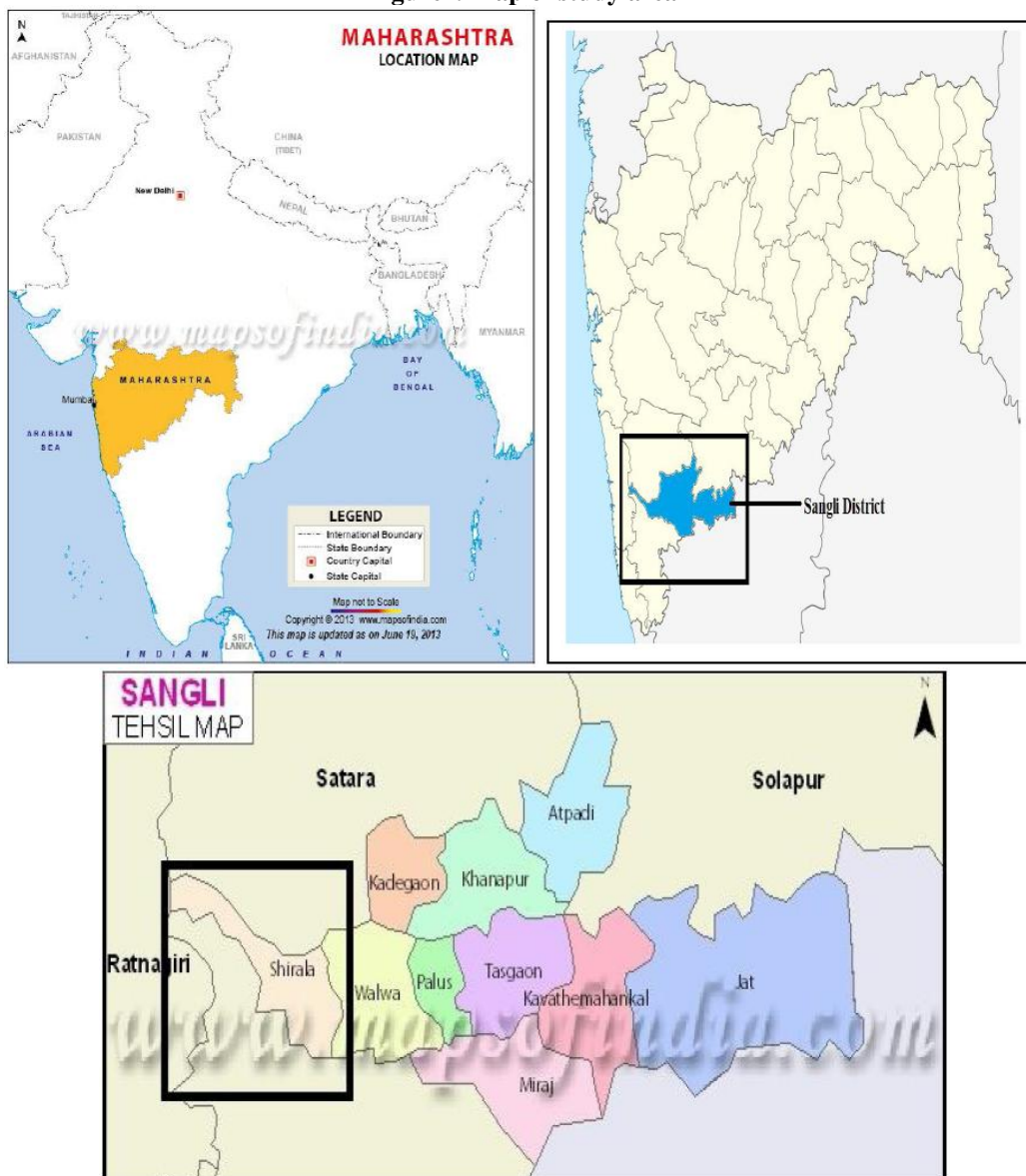
## 1. Introduction

Water is the one of the most important natural resource on our planet. United Nations Environment Program (1999) estimated that one third world's population uses groundwater for the drinking purpose. According to Prasad and Naryana (2004) ground water is natural resource for the various human activities. Ground water always contains dissolved as well as suspended substances of organic, inorganic and mineral origin but, increased level of these substances in water beyond normal level considered as polluted water. Bhosale (2004) reported that, misuse of ground water and pollution are the two more serious problems facing today. Water pollution have major problem creates due to urbanization, industrialization, waste disposals and excess use of chemical fertilization.

In India, about sixteen states viz. Andra Pradesh, Bihar, Delhi, Gujarat, Haryana, Jammu and Kashmir, Karnataka, Kerala, MadhyaPradesh, Maharashtra, Manipur, Orissa, Punjab, Rajasthan, Tamil Nadu and UttarPradesh have goes to excess fluoride (Mariappan, et al., 2000). Occurrence of fluoride and nitrate in drinking water were considered as contaminated water and may cause serious health problems (Assaf and Saadeh, 2009). Rao (2006) estimated that about 6 million Indian peoples were suffers from fluoride contamination due to ground water. No any information available on ground water quality of Shirala Taluka, Sangli District. Thus our present work has been highly focused on to assessment of drinking water quality in the different villages of Shirala Taluka.

## 2. Material and Methods

The study area of present investigation is located in Sangli District of Maharashtra state (Fig.1). The Sangli district is lies between 170 4' 57''N and 130 55' 56''E and covers area about 405.8 sq kms. The fresh samples were collected at pre monsoon from hand pumps. Collected samples were analyzed for different physico-chemical parameters such as pH, TDS, fluoride and nitrate as described in APHA (2001).

**Figure1. Map of study area**

### 3. Results and Discussion

The result found in present investigations is shown in table 1. The results revealed that, the pH of sample in study areas were ranges from 6.6 to 9.2. pH of village Mandur was highest about 9.2 and low pH was noticed in Panumbre Tarf Warun 6.6. The pH of sample in Mandur villages exceeds the limit of WHO. Our results show close conformity with findings of Priya Loni (2012).

**Table1. The physico-chemical parameter ground water.**

Sample No.	Villages	Type source of	pH	Parameters Analyzed (mg/lit)		
				TDS	Fluoride	Nitrate (as NO <sub>3</sub> )
1.	Shirala	HP	7.3	570	0.8	49.02
2.	Padlewadi	HP	7.3	410	BDL	48.42
3.	Antri Bk.	HP	7.4	570	BDL	49.1
4.	Red	HP	8.3	580	1.8	49.0
5.	Kharale	HP	7.6	160	1.9	BDL

6.	Panumbre Tarf Warun	HP	6.6	240	1.9	28.79
7.	Mandur	HP	9.2	130	1.8	BDL
8.	Gharewadi	HP	7.8	210	1.8	15.5
9.	Mangle	HP	7.4	1960	1.5	4.43
10.	Devwadi	HP	7.0	1200	BDL	0.77
11.	Ladewadi	HP	7.3	1640	1.6	BDL
12.	Kandur	HP	7.3	1120	BDL	33.22
13.	Natoli	HP	7.4	950	BDL	117.39
		Maximum	9.2	1960	1.9	117.39
		Minimum	6.6	130	0.8	0.77
		Average	7.5	749.230	1.63	39.56
		Std. Deviation	±0.636	±586.59	±0.3662	±33.13

BDL: Below Desirable Limits; HP: Hand Pump

TDS is the measure of all dissolved organic and inorganic substances in water (Dubey, et al., 2013). Our study found minimum TDS (130 mg/l) in Mandur village and very high (1960 mg/l) in Mangle village. The concentrations of fluoride in some samples were above the BIS permissible limit. In village's viz. Red, Kharale, Panumbre Tarf Warun, Mandur, Ghagrewadi and Ladewadi the fluoride content was detected to be just above the permissible limit. Among these villages sample from villages Kharale and Panumbre Tarf Warun showed highest fluoride content (1.9 mg/lit). The increased content of fluoride in drinking water may cause fluorosis in human being. According to Janardhan et al., (2009) concentration of fluoride in natural water mainly depend on temperature, pH, fluoride containing mineral, anion exchange capacity of aquifer materials. Nitrate content in ground water of Natoli village was too high about 117.39 mg/l as compare to other villages. High nitrite in drinking water may cause blue baby syndrome.

#### 4. Conclusion

The samples collected from different village's shows variation in results. The result revealed that pH, TDS, fluoride and nitrate of the sites exceed the desirable limit of WHO (2006). It indicates that the ground water in the study area is polluted due to unregulated human activities.

#### 5. Acknowledgement

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