



## **QUALITY OF DRINKING WATER AT CONSUMER END AT SAIDAPUR VILLAGE, TAL- KARAD, DIST- SATARA**

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### **ABSTRACT**

*Contamination of drinking water is a significant concern for public health throughout the world. In present study total 25 drinking water samples were collected from various locations at Saidapur village in the year 2022. The samples were subjected for physicochemical and biological analysis of water sample. All the collected samples were found to be odourless and colourless and clear in appearance. pH of water sample was found to be in the range of 6.8 to 8.2. Total hardness of water sample was found to be in the range of 20 -50 mg/lit. Microbiological analysis revealed that out of 25 samples 8 water samples were found to be potable while 17 water samples were found to be non-potable.*

**Key words:** Drinking water quality, water quality analysis, karad.

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### **INTRODUCTION**

Water is a vital resource for human survival. e. Clean drinking water is now recognised as a fundamental right of human beings. Around 780 million people do not have access to clean and safe water and around 2.5 billion people do not have proper sanitation. As a result, around 6–8 million people die each year due to water related diseases and disasters [1]. Therefore, water quality control is a top-priority policy agenda in many parts of the world [2]. A number of scientific procedures and tools have been developed to assess the water contaminants [3]. These procedures include the analysis of different parameters such as pH, turbidity, conductivity, total suspended solids (TSS), total dissolved solids (TDS), total organic carbon (TOC), and heavy metals. These parameters can affect the drinking water quality, if their values are in higher concentrations than the safe limits set by the World Health Organization (WHO) and other regulatory bodies [2]. Therefore, the investigation of the drinking water quality by researchers and governmental departments has been performed regularly throughout the world [4–5].

### **MATERIAL AND METHODS**

Saidapur village is located in Karad Tehsil of Satara district in Maharashtra, India. Karad is nearest town to Saidapur village for all major economic activities. 25 drinking water samples were collected from various locations at Saidapur village in the year 2022.

**Table 1.1 Water sample were collected in sterile plastic bottles, from following location described.**

Sr. No.	Water sample collection sites	Place
1.	Shivdarshan colony, House no.110	Saidapur, Tal-Karad, Dist-Satara
2.	Shivdarshan colony, House no.112	Saidapur, Tal-Karad, Dist-Satara
3.	Dnyandeep colony, House no.65	Saidapur, Tal-Karad, Dist-Satara
4.	Dnyandeep colony, House no.70	Saidapur, Tal-Karad, Dist-Satara

#### **Collection of water sample:**

Water Samples were collected in consumer's end in different places from Saidapur village, Tal-Karad, Dist-Satara. All the water samples were designated as shown in table no. Details of sample collection. Total 25 samples were collected for study.

**Physico-chemical analysis of water samples following test were carried out to study Physical Parameters.**

#### **Color:**

5 ml of water sample was taken in clean and dry test tube. It was held against path of light and then was visually compared with the distilled water, taken in other test tube in same amount.

**Turbidity:**

Water sample was taken in clean glass tube and was visually examined for turbidity.

**Temperature:**

The Thermometer was held at the point of sampling and the temperature was recorded in degree Celsius.

**Chemical Analysis:****pH :**

pH of water samples was measured the using of pH meter.

**Total Hardness:**

Total Hardness of water samples was measured the using of TDS (Ionix) meter.

**Biological Investigations:****Standard plate count:**

One ml of sample was taken in Test tube 0.1 ml was pipetted out and transferred on Nutrient agar. It was spread evenly using sterile spreader and incubated at 37°C for 24 hours and results were recorded.

**Most Probable Number of coliforms :**

Procedure: 10 ml of water sample was added to 3 tubes of Double strength Macconkeys broth. Out of the next 6 tubes of single strength of Mac-Conkeys broth, 1ml of water sample was added to 3 tubes and 0.1 ml of water sample was added to test of 3 tubes. All the tubes were incubated at 37°C for 24-48 hours. The tubes showing acid and gas production was positive. The results were compared to MacCraddy's table and recorded.

**Presumptive test:**

In this test appropriate amount of water sample was inoculated in Lactose broth tubes. Tubes were incubated at 37°C for 24-48 hours and checked for acid and gas production.

**Confirmed Test:**

All the tubes from presumptive test showing acid and gas production within 48 hours was used to perform the confirmed test. Inoculums from positive presumptive test were used to inoculate the special Media plates like EMB (Eosin methylene blue) and Endo agar. All the plates were incubated at 37°C for 24 hours. Results were noted down.

**RESULTS AND DISCUSSIONS:**

A Total 25 water samples were collected From Various locations at Saidapur village. The water samples were analyzed for physicochemical and biological characteristics. The physicochemical parameters were analyzed. The parameter for physical examination includes temperature, color and turbidity while parameter for chemical examination includes Total Hardness and pH. Microbiological analysis was carried out by MPN method.

All the water samples were found to be colorless and clear in appearance. pH of the water samples was found in the range of 6.8 to 8.2. Total hardness of water sample was in the range of 20 mg/l to 50 mg/l. Microbiological analysis revealed that out of 25, 8 (32%) water samples were found to be potable while, 17 (68%) water samples were found to be non- potable for drinking purpose. The conclusion was made on the basis of physicochemical and biological analysis. As the water sample was found to be contaminated with coliform it is advised to make the proper treatment to water sample before drinking.

**Table 1.2 Physico-chemical and biological characteristics of collected water samples from Saidapur village, Tal. Karad, Dist. Satara.**

Parameters	Water sample collected									
	No. 1	No. 2	No. 3	No.4	No.5	No.6	No.7	No.8	No.9	No.10
Color	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless
Odor	odorless	odorless	odorless	odorless	odorless	odorless	odorless	odorless	odorless	odorless
Temp.(°C)	30	27	28	29	30	28	32	29	28	27
Turbidity (NTU)	5.0	6.1	5.5	5.8	6.2	6.6	7.5	5.9	6.3	6.5
pH	6.8	6.5	6.4	7.5	7.2	7.1	6.7	6.4	7.2	6.8
Total hardness (mg/lit)	50	45	48	69	75	49	35	39	52	57
MPN Index/100	>2400	1100	>2400	>2400	460	>2400	150	320	>2400	480
Presumptive	Growth	Growth	Growth	Growth	Growth	Growth	Growth	No Growth	Growth	No Growth
Confirmed	Growth	Growth	Growth	No Growth	Growth	Growth	Growth	Growth	Growth	No Growth
Complete	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth	No Growth
SPC	10× 10 <sup>3</sup>	1× 10 <sup>3</sup>	9× 10 <sup>2</sup>	10× 10 <sup>2</sup>	9× 10 <sup>2</sup>	2 × 10 <sup>3</sup>	9× 10 <sup>2</sup>	6 × 10 <sup>2</sup>	7× 10 <sup>2</sup>	8× 10 <sup>2</sup>

**Table 1.3 Physico-chemical and biological characteristics of collected water samples from Saidapur village, Tal. Karad, Dist. Satara.**

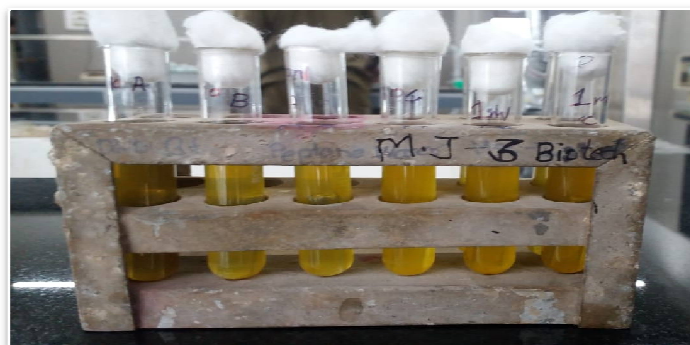
Parameters	Water sample collected									
	No. 11	No. 12	No. 13	No.14	No.15	No.16	No.17	No.18	No.19	No. 20
Color	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless
Odor	odorless	odorless	odorless	odorless	odorless	odorless	odorless	odorless	odorless	odorless
Temp.(°C)	28	27	30	32	28	26	31	24	26	27
Turbidity (NTU)	5.0	6.1	5.5	5.8	6.2	6.6	7.5	5.9	6.3	6.5
pH	6.9	6.4	6.8	7.2	7.5	6.9	6.8	6.6	6.5	6.9
Total hardness (mg/lit)	55	49	35	61	56	49	41	39	54	59
MPN Index/100	460	320	460	>2400	220	>2400	150	1100	>2400	480
Presumptive	No Growth	No Growth	No Growth	No Growth	Growth	Growth	Growth	No Growth	No Growth	No Growth
Confirmed	No Growth	No Growth	No Growth	No Growth	Growth	Growth	No Growth	No Growth	No Growth	No Growth
Complete	No Growth	No Growth	No Growth	No Growth	Growth	No Growth	Growth	No Growth	No Growth	No Growth
SPC	38	50	35	49	61	4x10 <sup>2</sup>	68	64	48	56

**Table 1.4 Physico-chemical and biological characteristics of collected water samples from Saidapur village, Tal. Karad, Dist. Satara.**

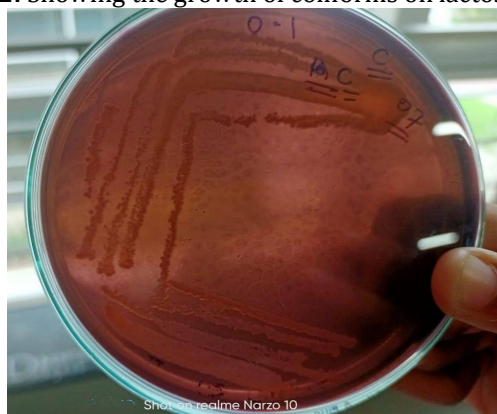
Sr. No	Parameters	Water sample collected				
		No. 21	No. 22	No. 23	No.24	No.25
1	Color	Colorless	Colorless	Colorless	Colorless	Colorless
2	Odor	odorless	odorless	odorless	odorless	odorless
3	Temp.(°C)	25	28	29	31	32
4	Turbidity (NTU)	6.5	5.8	5.6	5.4	5.9
5	pH	6.8	6.5	6.4	7.5	7.2
6	Total hardness (mg/lit)	57	65	38	63	61
7	MPN Index/100	>2400	1100	>2400	>2400	460
	Presumptive	No Growth	No Growth	No Growth	No Growth	No Growth
	Confirmed	No Growth	No Growth	No Growth	No Growth	Growth
	Complete	No Growth	No Growth	No Growth	No Growth	No Growth
8	SPC	10× 10 <sup>3</sup>	1× 10 <sup>2</sup>	9× 10 <sup>3</sup>	60	64



**Photo plate 1:** Showing the results of determination of MPN (Most Probable Number) test of coliforms



**Photo plate 2:** Showing the growth of coliforms on lactose broth tubes



**Photo plate 3:** The Growth of coliforms on EMB (Eosin Methylene blue) agar plate



**Photoplate 4:** Showing the Growth of SPC (Standard Plate Count) of bacteria on Nutrient agar plate

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#### CONFLICT OF INTEREST

There is no any conflict of interest between the authors. Each author has a contribution in this research and publication work.

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