

Water Quality Analysis in Sanaswadi, Pune

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Abstract: *The main goal of this study is to determine the various chemicals and substances present in surface, bore well and ground water. This water used for drinking purpose without treatment in village Sanaswadi, Pune. The water sample was collected from different places of Sanaswadi area. The quality of water is of vital concern for the mankind since it is directly linked with human welfare. Different physico-chemical parameter the water samples was analyzed. The analysis concludes that the water of Sanaswadi village is hard water which contains higher amount of Calcium and Magnesium as well as the water contains higher amount of carbonates and bicarbonates. The water provided by ground water sources of Sanaswadi village was not potable.*

Keywords: pH, Total Hardness, Total Alkalinity, Turbidity, Sanaswadi, Pune.

1. Introduction

Water is very essential part of all living organisms. Due to rapid population growth, industrialization and urbanization, the quality of surface water and ground water is decreased. Now days no any source of pure, healthy and safe water is available. The main use of water is for drinking purpose, cooking, household work, and irrigation. Water used on large scale for different industries as a coolant and for steam generation. Water should be free from the various contaminations viz. Organic and Inorganic pollutants, Heavy metals, Pesticides etc. as well as all its parameter like pH, Total Hardness, Electrical Conductivity, Total Alkalinity, Calcium, Magnesium, Carbonate, Bicarbonate, Chloride, Total Dissolved Solid, Sodium Potassium, Nitrate, DO should be within a permissible limit according to WHO. The drinking water should be analyzed regularly because it affects human health and caused various water borne diseases. The present study of physico-chemical parameters of drinking water involves analysis of various characteristics of ground water. Ground water from open well and bore well has an important role in rural areas especially in those areas where other sources of water like river, lake, dam and canal is not considerable. The quality of water is of vital concern for the mankind since it is directly linked with human welfare

2. Experimental Section

Study area selected for measurement of physico-chemical parameters of drinking water is village Sanaswadi, Tehsil Shirur of district Pune. Geographically Shirur Tehsil starts 24 km from Pune on the banks of river Bhima on Pune-Nagar road and ends at 50 km on the same road on the banks of River Ghod from Pune. Industry around Shirur bloomed around the year 1994 when the state of Maharashtra declared an industrial zone around Shirur, including towns of Shikrapur, Sanaswadi, Ranjangaon, and Karegaon. The industrial zone is known as MIDC Ranjangaon-Karegaon. Due to MIDC area, the rapid population growth takes place in Sanaswadi Grampanchayat area. The population under Sanaswadi Grampanchayat is around 26572. Area of Sanaswadi village is 57.6 Sq.km. Sanaswadi Grampanchayat cannot provide essential health related facilities to this

crowd in proper way. The drinking water supplied to peoples of Sanaswadi village is the untreated surface water of Bhima River. But this supply is insufficient, so the peoples using water from another sources like ground water of well or bore well. This water mainly used for drinking, household purpose, for animals and for farming. Ground water is the surface water that has passed slowly through soil, rocks into the earth. It is best source of drinking water. Percolation of ground water in the earth is very slow process. During percolation different pollutants, suspended particles and harmful bacteria are removed. This naturally purified water is of good quality for drinking purpose. During percolation Ca, Mg, Fe, Na, K like heavy metal ions, carbonates, bicarbonates, various anions like Cl^- , NO_3^- , SO_4^{2-} , and various gases like H_2 , O_2 , H_2S , NH_3 , Cl_2 can be dissolved in water.

3. Method

3.1 Sample Collection

The ground water of different areas of Sanaswadi village was collected in March 2015. The water samples are of open well and bore well source. The samples were collected in high density polyethylene and glass containers. The containers were rinsed twice by the same water sample and then the water sample filled in it. The water samples were analyzed for Colour, Temperature, pH, Electrical Conductivity (EC), Total Dissolved Solid (TDS), Total Alkalinity, Calcium (Ca), Magnesium (Mg), Bicarbonate, Total Hardness (TH), Chloride, Carbonate, nitrates and Sulphates using standard techniques. A.R. grade reagents were used for preparation of all solutions. Measurement of various physico-chemical parameters were carried out as in Standard methods given by the APHA.

4. Effects of Contaminated Water on Health

The water samples analyzed are hard water. These water samples contain heavy metals along with carbonates and bicarbonates. Hardness causing metal ions combines with different anions and forms Calcium carbonate, Magnesium carbonate, Magnesium hydroxide, Calcium Sulphate and Ferrous chloride etc. hard water mainly causes different

water born diseases. Presence of excessive Calcium carbonate in drinking water causes gastrointestinal, hyperacidity, constipation and diarrhea. Calcium carbonate for long period of time can harm kidney by increasing risk of kidney stones. Problem of dry skin, loss of hair can be causes due to use of hard water for long time. Hard water

forms scum with soap and detergent which decreases cleaning ability of soap. Deposition of scales takes place in hard water containers or pots and on water heaters. Alkalinity of water causes nutritional imbalance, allergies, metabsorption and poor digestion of food in stomach.

Table 1: Physico-chemical parameters for water of Sanaswadi village

Sr. No.	Parameters	Standards Values as per IS:10500:2004	Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
1	Colour	5-25	Clear							
2	Odour	unobjectionable	None							
3	Temperature	Acceptable	30°C							
4	pH	6.5 -8.5	6.77	7.30	7.23	7.19	7.62	7.27	7.34	7.38
5	Turbidity	5-10	0.5	0.45	0.52	0.5	0.53	0.49	0.48	0.51
6	Electrical Conductivity	200-600	445	251	254	173	145	168	210	220
7	Total Hardness in terms of CaCO ₃	300-600	1792	1728	1440	1472	1184	1312	1632	1248
8	Total Dissolved Solids	500-2000	1367	1088	892	933	778	850	1205	808
9	Total Alkalinity	200-600	880	840	780	1020	720	820	800	740
10	Chloride	250-1000	42.1	38.5	31	32.4	20.8	29.1	35.3	24.1
11	Sulphate	200-400	39	36.3	31.4	32.1	22.2	28.5	33.8	26.9
12	Nitrates	45-100	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
13	Total Coliform	Nil-10	Nil							
14	E.Coli	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

5. Result and Discussion

The water samples analyzed for physico-chemical parameters of ground water i.e well and bore well water in March 2015 presented in table 02 concludes that;

- The pH values of water sample ranges in between 6 to 8 against the standards of WHO and IS 10500:2004.
- The turbidity of ground water samples were obtained after analysis of water samples has values from 0.4 to 0.5NTU. All determined values of water samples show very less values of turbidity than permissible values of WHO.
- The electrical conductivity of groundwater samples which was analyzed for physico-chemical parameters was found in the range of 100-500 µmhos/cm. This measured values of electrical conductivity less than WHO standards. The ground water sample 01 and 05 are showing higher and lower values of conductivity in the collected water samples respectively.
- The total hardness of water represents primarily the total concentration of Ca²⁺ and Mg²⁺ ions in terms of CaCO₃. The analyzed water samples contain total hardness within the range 1000 to 2000 mg/l. Water sample 1 has highest hardness i.e. 1792 mg/l.
- Presence of Calcium and Magnesium mainly causes hardness in water. Hard water which contains hardness above 200 ppm not useful for drinking purpose. The water samples analyzed here was hard water since hardness of all the samples is above 1000 mg/l.
- The Total Alkalinity of water represents presence of carbonates, bicarbonates and hydroxides,. All studied water samples does not contain Phenolphthalein alkalinity. Total alkalinity of analyzed ground water ranges from 700 to 1000 mg/l, which is above the permissible limit. This results shows that all water samples contains maximum amount of carbonates in water.

- The studied water sample contains very less amounts of Chlorides, Sulphates and Nitrates than permissible values of WHO.
- No any type of bacteria i.e. total coli form and E.coli was detected in 100ml of all water samples.

The results of analysis show that the water samples collected from different ground water sources of Sanaswadi village were polluted. It contains high amount of hardness and alkalinity causing ions. This water should be treated before using it as drinking water.

6. Conclusion

It was concluded that the drinking water of villages of Sanaswadi is not potable. To maintain quality of groundwater, continuous monitoring of physicochemical parameters should be check. Then that water can be used for cooking and drinking only after proper treatment.

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