

Physico-chemical analysis of borehole water in Pandharkawada (M.S.), India

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Abstract

The present study of water quality analysis was done to know the present status of potable water with respect to health and domestic use. The water samples were collected from different sites (ward) of Pandharkawada town. The study was carried out from January 16 to July 16 for six month period. The water quality was analyzed using different types of analytical techniques. The parameters includes electrical conductivity, turbidity, pH, TDS, TSS, SS, hardness, alkalinity, using standard method of analysis. After the analytical studies, one of the site (B3) was found to be slightly acidic (pH-6.2) while others were within limit of WHO

Keywords: Pandharkawada, potable water, WHO, Maharashtra

1. Introduction

The In nature, water is abundant. It occurs as surface water in lake, streams, ice caps, glaciers etc and as ground water which is obtained as spring water, well water and borehole [1]. In water, small amount of gases like N₂, O₂ and CO₂ in the atmosphere are contained [2] and the ability to dilute many chemicals and take part in many reactions. Subversive water is typically wealthy in dissolved solids especially carbonate

and sulphate solid particularly carbonates and sulphates of calcium and magnesium.

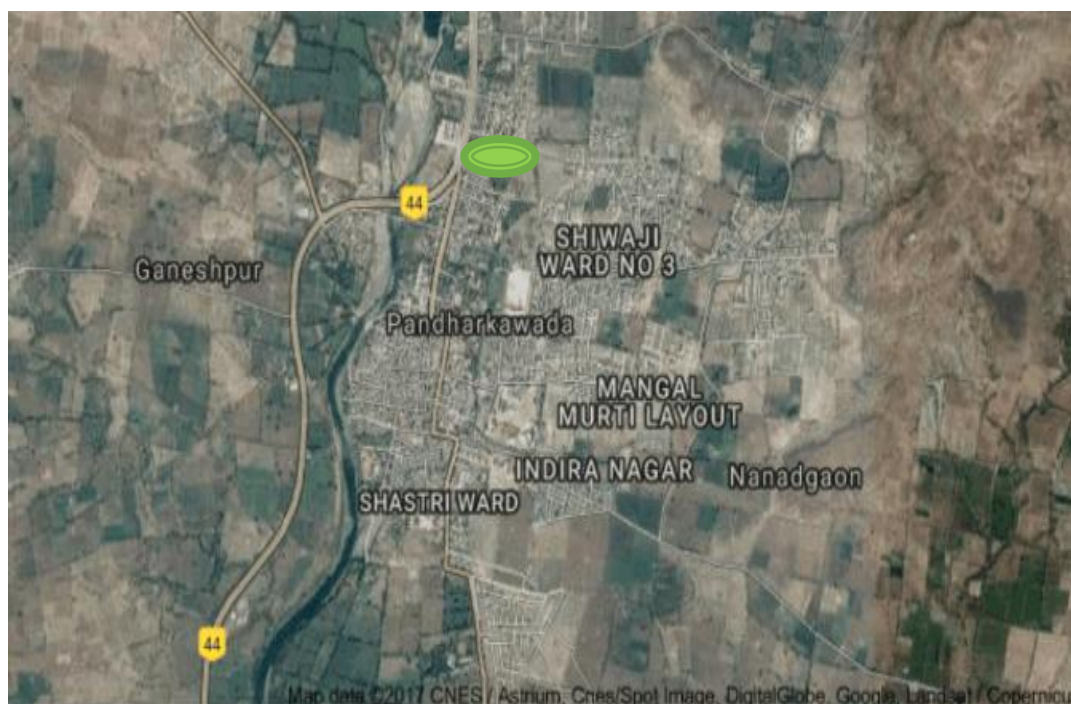
Now a days, Human activities like manufacturing process (Industry), Municipal leakage as liquid waste and solid waste and Agricultural process involving the use of fertilizers, herbicides, and pesticides which produce toxic substance that are transported as effluents into water sources and pollute water bodies [3].

Ground water is used as drinking water without testing the good quality. Hence; it is necessary to obtain physico-chemical characteristic of ground water so as to analyze the water quality and determine the type of treatment before use.

2. Material and Method

2.1 Study site

Water samples were obtained from boreholes of five different sites having different geographical location (wards). We selected city Pandharkawada of district Yavatmal, in Maharashtra state of India. For the study, we chose different study sites and named B1, B2, B3, B4 and B5. The geographical location of the site has between 20°02'01'' East (latitude) and 78°54'24'' North (longitude). It is located in Yavatmal district of Maharashtra state which is present in central region of India and eastern part of state of Maharashtra. It is 145 km away from Nagpur.



Courtesy-Google

Fig. Satellite Study Map of Study Sites

2.2 Sample Collection and Analysis

The sterile 250 ml plastic bottle was used for each sample. The water from the sample was analyzed for temperature, colour, turbidity, pH, total dissolved solids, conductivity and alkalinity etc.

2.3 Physical Test

Physical test such as colour, turbidity, total solids, dissolved solids, suspended solids; OD our and taste were carried out using standard instruments and method.

2.4 Chemical Test

Chemical analysis of water for BOD, pH, TDS, TSS, SS, hardness, alkalinity Nitrate and sulphate was done using standard method of analysis ^[4].

3. Result and Discussion

After the analytical studies, one of the sites (B3) was found to be slightly acidic (pH-6.2) while others were within limit of

WHO ^[5]. The mean TDS for all the boreholes was recorded 658.4 mg/l. Only samples from site B3 were out of range of the recommended standard values. Maximum peoples are using relatively expensive water treatment processes, such as reverse osmosis to remove excessive dissolve solids from water. The mean value for turbidity was 4.74 NTU which fall within the recommended standard. It suggests that, geology of the area is enough and does not particulate matter such as microscopic organisms, silt and clay. The electrical conductivity o of all samples from the different sources was within the WHO acceptable limits. The temperature from various sources varied from 28 °C to 34 °C with an average of 31°C. The value for BOD (average 3.24 mg/l) did not meet the limits of WHO ^[5]. The value for sulphate met the WHO acceptable limits (47.5 mg/l).Elevated nitrate concentration is caused by run-off from barnyards, excessive use of fertilizer or septic tanks. Only one sample was not met the WHO limits.

Table 1: Physico-chemical analysis of water from water boreholes

Sr. No.	Parameter	Ward1 (B1)	Ward 2 (B2)	Ward3 (B3)	Ward 4 (B4)	Ward 5 (B5)	WHO
1.	TDS (mg/l)	632	589	754	634	683	500
2	TSS (mg/l)	512	753	689	543	574	-
3	SS (mg/l)	2	1	1	2	1	-
4	Total hardness	356.54	534.64	512.56	563.86	523.96	
5	Alkalinity (mg/l)	59	74	35	78	82	80
6	pH	7.3	7.5	6.2	7.6	7.3	7.0-8.5
7.	BOD	3.5	3.8	2.7	2.6	3.6	5-14
8.	Sulphate	47	48	48	49	47	50
9	Taste	Tasteless	Tasteless	Tasteless	Tasteless	Tasteless	Tasteless
10.	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
11.	Turbidity (NTU)	4.43	4.45	5.64	4.6	4.76	5
12.	Nitrate	46	47	47	42	49	50
13.	Conductivity	1167	1174	358	1374	1746	
14.	Odour	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless

4. Conclusion

Increase in population of Pandharkawada city leads to human activity and great pressure on water. The Physico-Chemical properties of boreholes were assessed for drinking purpose and the conclusion are drawn that all the physical and chemical parameters of borehole were within the limits of WHO ^[5]. There is only problem of TDS which was slightly above the WHO limits. From the result obtained from the analysis recommended that proper standard measures be taken by the appropriate authority to ensure proper treatment of the water regarding the health of peoples. Such type of water analysis should be done regularly. Hygienically approved method for waste disposal should be adopted.

5. References

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