Physico chemical Analysis of Groundwater Samples from Barshitakli, District Akola (MS).

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Abstract: *Water is extremely essential for survival of Life. On earth water is present in oceans, ice glaciers, underground and on ground. By the process of hydrological cycle fresh water is continuously get recharged. Ground water table is revitalized by percolation of rain water through soil and rocks. Potable water is primary need of human as it serves as lubricant, regulates body temperature and provides the basis for the body fluids and metabolism At global level most of the deaths were occurred due to waterborne diseases. Thus monitoring altered physico chemical parameters is essential to check water quality. The Drinking water samples of 5 different tube wells from Barshitakli area were collected in plastic bottles and Physico chemical parameters of water such as Colour, Odour, pH, EC, TDS , Chloride, Alkalinity, Hardness, DO, BOD, COD were analysed. From the result it is concluded that 5 different tube well of Barshitakli were found safe for drinking and domestic use.*

Keywords: Physico chemical, Barshitakli, tube well etc.

I. Introduction:

The first life on earth is evolved in water. Water is very essential for survival of Life. On earth water is present in oceans, ice glaciers, underground and on ground. By the process of hydrological cycle fresh water is continuously get recharged. Ground water table is revitalized by percolation of rain water through soil and rocks. The quality of water is fundamental concern for humans as it is directly linked with health. Water is the central requirement for industry, farming, economic development many nourishing natural systems[1]. Potable water is primary need of human as it serves as lubricant, regulates body temperature and provides the basis for the body fluids and metabolism [2]. It is key requirement for maintaining personal hygiene.

While percolating many contaminants were added in to potable water, besides this now a days the rate of adding contaminants accelerated by humans anthropological activities such as adding excessive pesticides, insecticides, chemical fertilizers and improper management of rain water, pollution, urbanization, industrialization and discharge of sewage makes it unfit by altering its ideal physico chemical properties, such as colour, odour, pH, electrical conductivity, chloride content, alkalinity, hardness, Dissolved Oxygen, Biological Oxygen Demand, Chemical Oxygen Demand, and Total dissolved solids[3]. At global level most of the deaths were occurred

due to waterborne diseases. Thus monitoring altered physico chemical parameters is essential to check water quality. Present research work under taken for the analysis of physico chemical properties of five randomly selected drinking tube wells form Barshitakli Tahsil, District Akola (MS) India.

II. Materials and Methods:

For the present research work one liter water was collected from each sampling site in the month of January 2020. The Drinking water samples of 5 different tube wells from Barshitakli area were collected in plastic bottles and preserved according to standard methods [4]. Collected water samples were having varying depth of 30 to 100 meters.

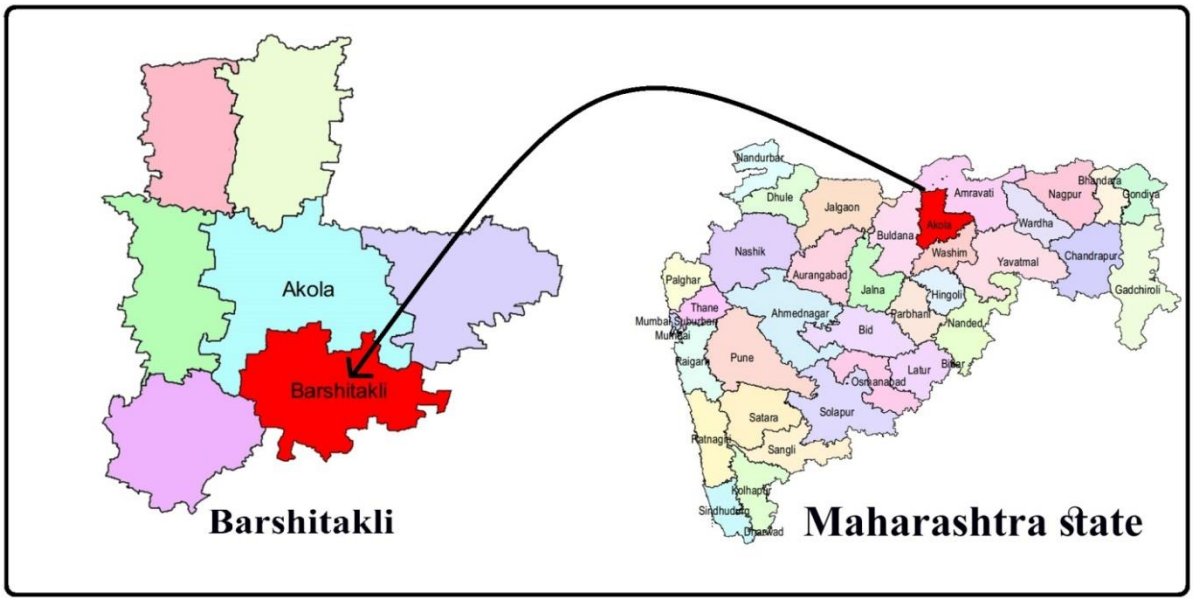

Figure01: location of study area showing in the map of Maharashtra.

Barshitakli is located at N 20° 57’ 91”, E 77° 06’ 67”. It has an average elevation of 312 meters from sea level. Barshitakli is the nearest taluka of Akola district. It is situated in *Vidharbha* region of Northern Maharashtra. Barshitakli is famous for cotton industry. Barshitakli’s water bearing formation is basalt (Deccan trap) fractured, jointed under phreatic conditions and the soil type is medium black and deep black soil [5].

Physical parameters of water such as Colour, Odour, pH, Electrical Conductivity, Total Dissolved Solids were analysed on sampling site and chemical parameters such as Chloride, Alkalinity, Hardness, Dissolved Oxygen, Biological Oxygen Demand, Chemical Oxygen Demand were analysed within 24 hours by standard methods [6-7].

All physico chemical parameter were performed in triplicates and average was considered as the reading also data was analyzed statistically. The simple linear correlation analysis has

been carried out to find out correlation between parameters [8]. The analyzed data were compared with standard values recommended by WHO [9].

III. Result and Discussion:

The physico chemical parameters of drinking water collected from 5 different sites in and around Barshitakli were recorded and presented in table 01 while Table 02 shows the correlation between each parameter.

3.1. Physical parameters:

All samples were colourless and odorless at the time of collection. Acidic and alkaline condition of sample was determined by pH. All are the samples are basic except sample S5 is acidic. Hence all the samples of drinking water were found within desirable rang according to WHO and ICMR [10]. The pH all the sampling sites ranged from 6.80 to 7.48. The pH controls chemical state of many nutrients, phosphate, nitrate and also dissolved oxygen [11]. Electrical conductivity ranges from 167.24 to 197.81 μΩ/cm. Electrical conductivity is positively (0.9884) correlated with TDS. Same results were recorded by Patil and Patil (2010) [12]. Electrical conductivity is determines the capacity of water to transmit electric current. It signifies the total number of dissolved salt [13]. TDS is the dissolved solids and it indicates the behavior of salinity in the groundwater. Water having more than 500 mg /L is not considered for drinking [14]. Lowest TDS is recorded in sample S6 while Highest TDS is found in sample S3. Generally it is assumed that TDS and Hardness are positively correlated with kidney stone patient but it is not related on the parameter it depends on drinking habits of people [15].

Table 01: Phyco chemical parameters of water samples from Barshitakli.

Sr. No	Parameters	S1	S2	S3	S4	S5
1	Colour	Colourless	Colourless	Colourless	Colourless	Colourless
2	Odour	odourless	odourless	odourless	odourless	odourless
3	pH	7.23	7.25	7.48	7.45	6.80
	SE	±0.0328	±0.0376	±0.0318	±0.0167	±0.1528
4	EC (μΩ/cm)	170.33	175.80	197.81	202.28	167.24
	SE	±0.0578	±0.0367	±0.4125	±0.4257	±1.2473
5	TDS (mg/L)	475.00	490.00	584.33	577.33	452.33
	SE	±1.5275	±1.7321	±2.6034	±1.2019	±1.8559

6	Alkalinity (mg/L)	315.33	317.33	345.33	285.00	295.67
	SE	±0.6667	±1.2019	±2.7285	±0.5774	±2.0276
7	Hardness (mg/L)	188.00	191.33	204.00	202.00	167.33
	SE	±0.5774	±0.8819	±0.5774	±0.5774	±1.7638
8	DO	8.47	9.10	8.43	7.93	7.23
	SE	±0.0882	±0.0577	±0.0667	±0.0882	±0.0333
9	BOD	2.70	2.50	2.97	3.07	3.37
	SE	±0.1155	±0.0577	±0.0667	±0.0333	±0.0882
10	COD	238.00	253.67	245.33	263.67	265.33
	SE	±1.0000	±2.3333	±1.4530	±2.3333	±1.4530
11	Chloride(mg/L)	207.33	210.67	201.33	221.33	205.33
	SE	±0.8819	±1.2019	±0.8819	±0.8819	±0.8819

Table 02: Correlation Matrix of different water quality samples form Barshitakli.

	pH	*EC*	*Chloride*	*Alkalinity*	*Hardness*	*DO*	*BOD*	*COD*	*TDS*
pH	*1*								
EC	*0.8292*	*1*							
Chloride	*0.2906*	*0.3895*	*1*						
Alkalinity	*0.1373*	*0.2861*	*-0.5912*	*1*					
Hardness	*0.9975*	*0.8553*	*0.2901*	*0.1893*	*1*				
DO	*0.5688*	*0.0828*	*-0.0242*	*0.1017*	*0.5534*	*1*			
BOD	*-0.4283*	*0.1057*	*-0.0513*	*0.1403*	*-0.3994*	*-0.9629*	*1*		
COD	*-0.3809*	*0.1096*	*0.4812*	*0.0186*	*-0.3327*	*-0.6127*	*0.6203*	*1*	
TDS	*0.8686*	*0.9884*	*0.2660*	*0.3600*	*0.8921*	*0.1583*	*0.0452*	*-0.0200*	*1*

3.2. Chemical Parameters:

Water said to be alkaline when concentration of OH ion is more than H ions. Alkalinity ranges from 285.00 mg/L to 345.33 mg/L .The alkalinity of ground water is because of carbonates and bicarbonates [16]. Concentration of alkaline earth metal cations combienly present in water is called as Hardness. Among five sampling site the highest Hardness was recorded 204.00 mg/L at site S3 while lowest hardness was recorded at site S5 i.e. 167.33 mg/L. According to Kanan (1991) among five samples water form S5 was found moderate hard and rest of samples were found very hard [14]. Dissolved Oxygen is important parameter for to measure physical and biological processes prevailing in the water. It reflects the extend of pollution in water bodies.

DO was recorded in the range of 7.23 at sampling site S5 to 9.10 at sampling site S2. BOD is the best indicator of pollution in water which states the strength of decomposable organic metal. BOD was observed highest at site S5 viz. 3.37 while lowest at site S2 viz. 2.50. COD was found in range between 238.00 to 265.33. Chloride was recorded highest in sample S4 and lowest in sample S3 i.e. 221.33 & 201.33 respectively. More concentration gives salty taste to water and water becomes unsafe for drinking. According to WHO [9] 250 mg /L is safe for drinking and all samples are safe for drinking.

IV. Conclusions:

It is concluded from the present research work that water collected from 5 different tube well of Barshitakli were found safe for drinking and domestic use.

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