PHYSICOCHEMICAL STUDIES OF WATER FROM SELECTED BOREHOLES FROM VILLAGES OF BARSHITAKLI TAHSIL, DISTRICT AKOLA, (M. S.) INDIA

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ABSTRACT

The physicochemical parameters of water from 25 Boreholes from 3 different villages in Barshitakli block of Akola District, Maharashtra State, India were determined within the period of six months from February 2019 to July 2019 to investigate their quality. Analyses were done on water samples for pH, Turbidity, Total dissolved solids (TDS), Alkalinity, Total hardness, Nitrate, Fluoride and Iron using standard methods and evaluated with the World Health Organization standards. All physicochemical parameters analyzed in borehole water samples were within recommended standards except the following: alkalinity ranged from 300.0 to 580.0mg/l with a mean value of 402.08± 71.46 mg/l, Total Hardness 264-776 mg/l (415.40±92.30 mg/l mean), Total Dissolved Solids (TSS) 429.0-1340.0 mg/l (741.48±194.22 mg/l mean) all generally above Indian standard limit. But as per the IS 10500, if other source is not available these limits are permissible. Thus apart from some cases the general results showed that water from the boreholes in the studied area is acceptable quality for drinking and household utilization.

Keywords: *Borehole, Water Quality, Physicochemical Properties.*

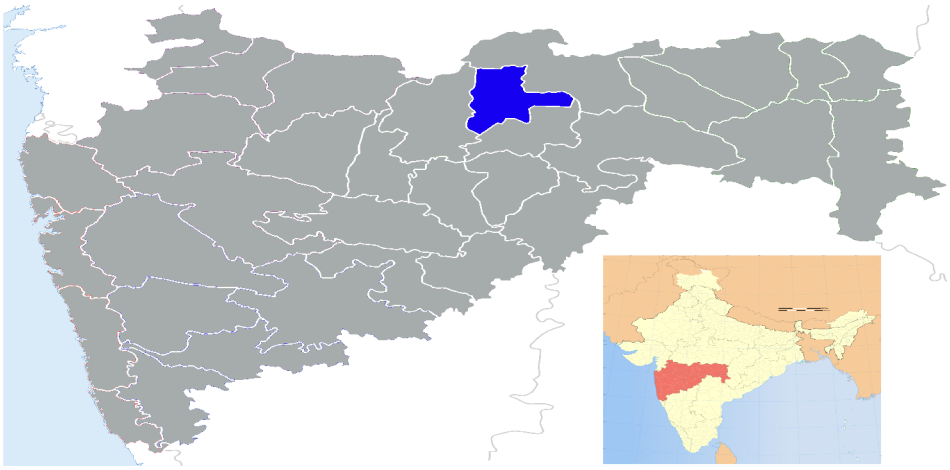
Introduction

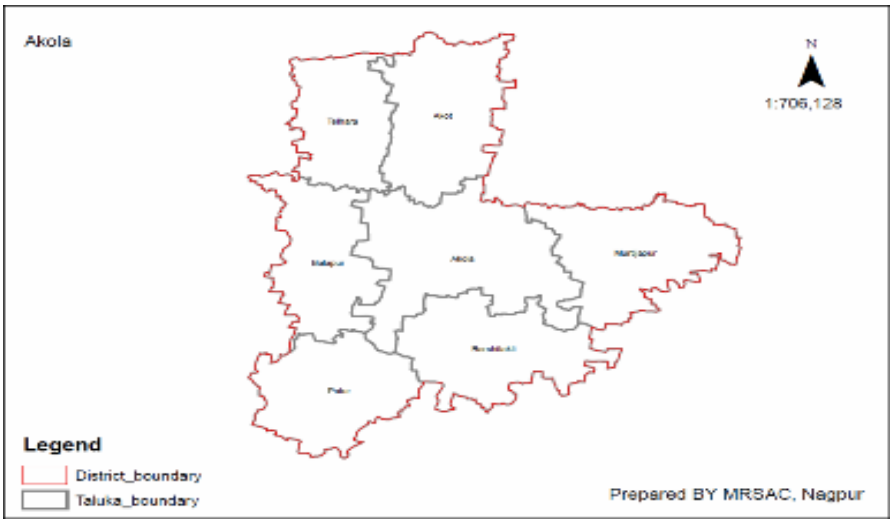
Groundwater is used for domestic and industrial water supply and irrigation all over the world. In the last few decades, there has been a tremendous increase in the demand for fresh water due to rapid growth of population and the accelerated pace of industrialization C. R. Ramkrishnaiah et al., (2008). As water is one of the most important compounds of the ecosystem, but due to increased human population, industrialization, use of fertilizers in the agriculture and man-made activity. The natural aquatic resources are causing heavy and varied pollution in aquatic environment leading to pollute water quality and depletion of aquatic biota. It is therefore necessary that the quality of drinking water should be checked at regular time of interval, because due to use of contaminated drinking water, human population suffers from varied of water borne diseases Basavaraja Simpi et al., (2011). The water used for drinking purpose should be free from toxic elements, living and non-living organisms and excessive amount of minerals that may be harmful to health B. Rajappa et al., (2011). Pollution of groundwater due to industrial effluents and municipal waste in water bodies is another major concern in many cities and industrial clusters in India. Groundwater is very difficult to remediate, except in small defined areas and therefore the emphasis has to be on prevention M. R. Mahananda et al., (2010). The present work attempts to measure the water quality of various boreholes of three villages of Barshitakli Tahsil district Akola, Maharashtra, India.

Materials and Methods

Study area: Three villages are selected from Barshitakli Tahsil. The following figure shows the location on map.

The Water Samples from 3 villages were collected in the morning hours between 10 to 12 am in Polythene bottle. The Water samples were immediately brought in to laboratory for the estimation of various parameters. Distilled water was used as a Control Sample D.S. Rathore (2014). Standard Procedures (Titration method, Atomic Absorption Spectrophotometer (AAS) were performed as per APHA.



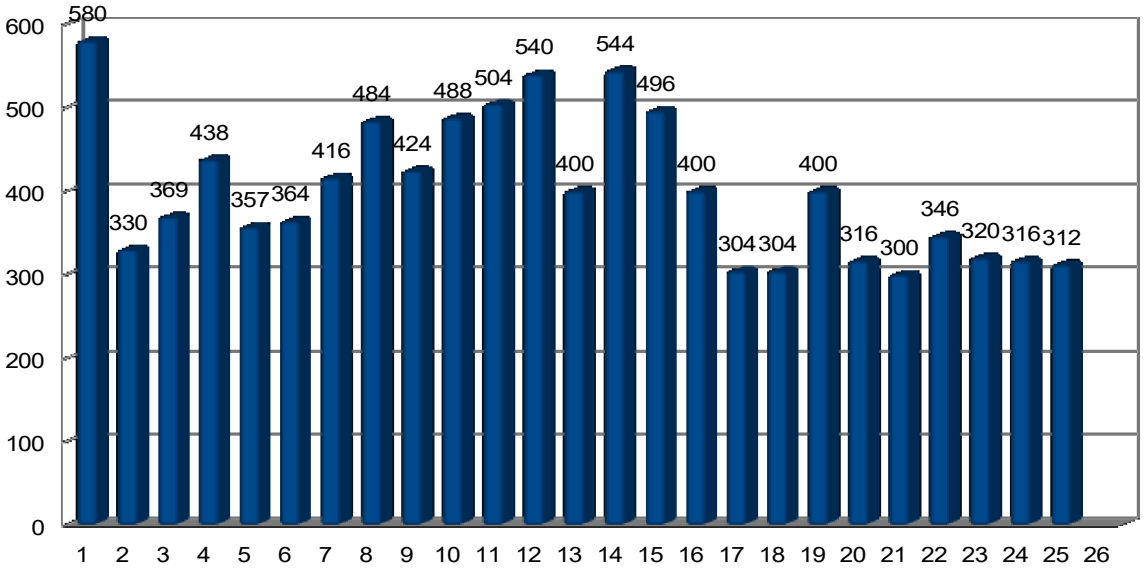


Sr. No	Location	Physical app	Odour	Turbidity	pH	Alkalinity	Total hardness as CaCo3	Total Dissolved Solids	Fluoride as F	Chloride as Cl	Nitrate as NO3	Iron as Fe
1	Alanda	Clear	Odourless	0.58	7.49	580	412	752	0.04	120	25.76	1.09
2	Alanda	Clear	Odourless	0.69	7.42	330	776	1071	0.13	152	36.25	0.9
3	Alanda	Clear	Odourless	0.56	7.51	369	457	884	0.11	147	28.61	0.84
4	Alanda	Clear	Odourless	0.61	7.44	438	398	901	0.08	112	31.27	0.9
5	Alanda	Clear	Odourless	0.66	7.81	357	406	896	0.07	98	29.41	1.05
6	Alanda	Clear	Odourless	1.01	7.38	364	480	783	0.279	116	39.537	0.851
7	Rustamabad	Clear	Odourless	1.06	7.71	416	420	598	0.787	70	29.69	0.523
8	Rustamabad	Clear	Odourless	0.73	7.69	484	400	944	0.484	170	56.12	0.066
9	Rustamabad	Clear	Odourless	0.78	7.49	424	336	621	ND	80	57.892	0.255
10	Rustamabad	Clear	Odourless	0.83	7.59	488	484	807	0.108	114	34.18	0.458
11	Rustamabad	Clear	Odourless	0.85	7.66	504	344	682	ND	118	25.41	0.061
12	Rustamabad	Clear	Odourless	1.06	7.45	540	592	1300	0.085	302	42.1	0.158
13	Rustamabad	Clear	Odourless	0.83	7.53	400	528	737	0.04	168	80.88	0.13
14	Rustamabad	Clear	Odourless	0.71	7.65	544	400	906	0.211	178	65.176	0.08
15	Rustamabad	Clear	Odourless	0.62	7.33	496	740	1340	0.114	306	66.948	0.22
16	Morhal	Clear	Odourless	0.81	7.86	400	340	551	0.262	28	33.19	ND
17	Morhal	Clear	Odourless	0.91	7.88	304	264	429	0.621	52	34.6	0.07
18	Morhal	Clear	Odourless	0.61	7.9	304	288	455	0.576	56	24.8	0.033
19	Morhal	Clear	Odourless	1.03	7.86	400	408	592	0.353	70	34	0.04
20	Morhal	Clear	Odourless	0.98	7.43	316	332	605	0.747	124	31.56	0.05
21	Morhal	Clear	Odourless	0.93	7.84	300	280	533	0.98	90	40.87	0.32
22	Morhal	Clear	Odourless	1.05	7.78	346	352	599	0.416	94	33.93	0.04
23	Morhal	Clear	Odourless	1.06	7.8	320	324	481	0.57	52	38.71	ND
24	Morhal	Clear	Odourless	0.83	7.5	316	288	476	0.467	76	32.76	0.14
25	Morhal	Clear	Odourless	0.85	7.95	312	336	594	0.467	130	57.46	0.07

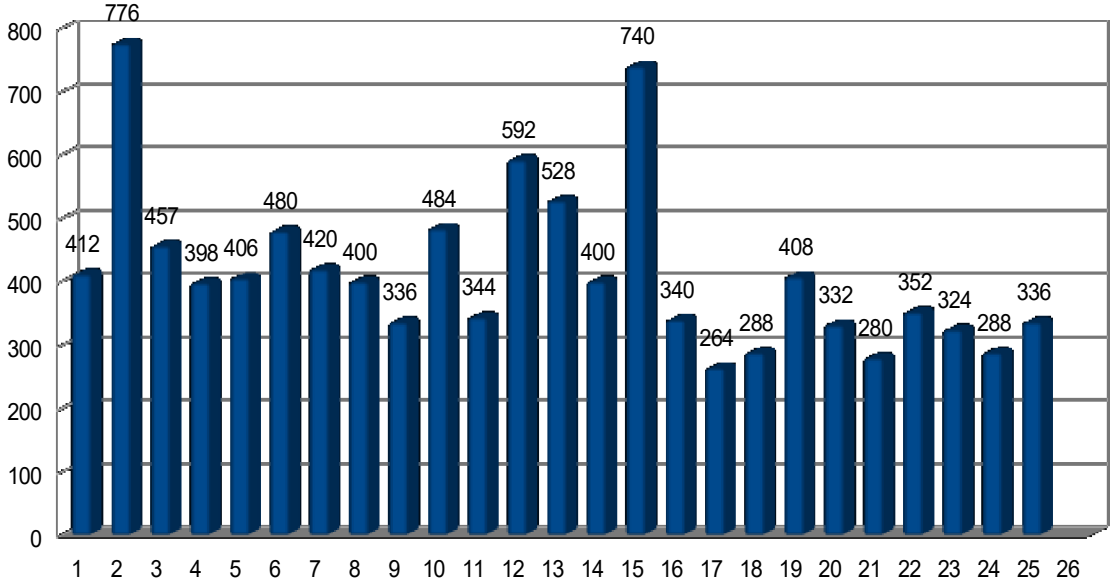
Tables 1: The result of the physicochemical analysis performed is shown in table.

Results and Discussion

The results of the physicochemical analysis performed have been recorded in Tables 1. The water samples had acceptable levels of pH in the range of 7.38 – 7.95. In the case of turbidity, none of the sample exceeds the limits of 5 NTU. Hardness and alkalinity of drinking water are said to be acceptable at 300mg/L and 200mg/L respective according to the WHO. Alkalinity of 402.00 mg/L is however also acceptable by the IS 10500 if other source does not available. The range of Total Dissolved Solids is large, 429.00 1340.00 ± 245.12 mg/L. Fluoride shows all the results within limits. Very few locations shows more chloride and nitrate concentration that the standard values. Iron concentration is within limits for all the studied location. The graphical representation of alkalinity and total hardness is shown separately.



Graph 1: Graphical Representation of Alkalinity



Graph 2: Graphical Representation of Total Hardness

Conclusion

There is more variation in the concentration of Alkalinity and total hardness. Total Dissolved Solids (TSS) 429.0-1340.0 mg/l (741.48±194.22 mg/l mean) all generally above Indian standard limit. But as per the IS 10500, if other source is not available these limits are permissible. Thus apart from some cases the general results showed that water from the boreholes in the studied area are of acceptable quality for drinking and household utilization.

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